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General Examinations and Tutors in Harvard College[1]

HISTORY OF THE SYSTEM

THE use of examinations as a measure of attainment never ceased at Harvard, and, in fact, with the more rigorous training introduced by President Eliot into the Schools of Law and Medicine, the practice became general throughout the University. But with the growth of the elective system it came to have a special function. In the College that system began by permitting the substitution of an elective for some required course; at first in the senior year, then in the junior. The process was gradually carried farther and farther—in each case substituting any elective for a course previously required—until it reached the point that nothing was required except a course in English composition and one or two in modern languages if those subjects had not been included in the examinations for admission. Since the choice of electives was otherwise wholly free, it came about that the qualification for a degree was English A and any sixteen other courses, completion of each being proved by one or more examinations on what had been taught in the course. The examination paper had, therefore, to be prepared by the instructor who gave the course, for he alone knew the ground he had covered; and thus the degree was obtained by an accumulation of credits in inde-

[1]As a follow-up of the report by L. B. Hopkins on "Personnel Procedure in Education," published as Supplement to the Educational Record for October, 1926, the Committee on Personnel Methods invited each of the institutions involved to write a description of some one phase of personnel work in which it is doing something significant. This number of the EDUCATIONAL RECORD contains six of the articles written in response to this request and describes special personnel activities at Harvard, Yale, Stanford, Dartmouth, Minnesota, and Northwestern respectively. Other articles of this series will follow later.—EDITOR.

pendent courses. A similar process went on in the examinations for admission. At first these were rigidly fixed and were all taken at one time; then options were allowed, and finally the candidate was permitted to offer as few at a time as he pleased; so that admission, like graduation, was attained by a sum of credits which might be earned disconnectedly and at intervals.

The first departure from this system was made in pursuance of the report of a committee appointed in 1908 to "consider how tests for rank in college may be made a more generally recognized measure of intellectual power." On June 1, 1909, it recommended that rules for the choice of electives should be prepared, "based upon the principle that a student must take courses enough in some one field to lead to a degree with distinction, and must distribute the rest of his courses so as to leave none of the chief branches of learning wholly untouched." The report was adopted by the Faculty, and a standing Committee on the Choice of Electives worked out in detail a plan, which was enacted by the Faculty in December of that year. This change, like the provision for majors in other colleges, secured to the student something approaching a systematic knowledge of some subject, and laid the foundation for further progress.

A more direct breach in the practice of measuring by credits in courses was taken in the spring of 1910. All students who did not pass examinations for admission in both French and German had been required to elect, among their sixteen courses, one in the language that they had not so passed, or in each language if they had passed neither at entrance. Yet when they came to courses in which the use of French books, for example, was needed, a large part of the class proved unable to read them. The requirement in modern languages was therefore changed from that of taking a course, to that of being able to read ordinary prose, to be proved by a special examination in so doing. This was a distinct step in substituting a direct test of capacity for a credit in the process of instruction.

Another advance in the same general direction was made

in January, 1911, when an alternative method of admission was adopted, still commonly known here as the "new plan." The motive was a desire to open a door from schools in other parts of the country that do not arrange their studies as a preparation for college entrance examinations; but the result was a new principle of measuring fitness for college work. Instead of examining on all the subjects in the four years of secondary school work, and doing it piecemeal, the fact that an appropriate curriculum had been pursued was accepted on the statement of the head-master, and the examination was confined to four typical subjects, which must be passed well, and at the same time. The object was to determine, not what a youth had done at sundry times in the past, but what kind of capacity he had obtained and what he had become as the result of his schooling. It was an attempt to get an impression of the individual as he stands, rather than of the instruction he has been through.

In explaining the principle of concentration in his annual report for 1908–09, the president remarked: "It may be hoped that, under the new rules for the choice of electives, some form of general examination at the end of the college life on the principal field of study will be more commonly required." This hope was fulfilled first, not in the college, but in the medical school. Education for medicine is peculiarly difficult because it requires the study of many subjects whose interrelation, and whose connection with practice, is far from self-evident. Hitherto, as was usual in all American education at that time, the degree had been conferred upon the completion of a fixed number of courses, but complaint was made that the system was inelastic, and lacking in stimulation. It was said that the student might graduate without retaining sufficient knowledge of the subjects he had studied, without coordinating them, and, indeed, without sufficient inducement to do so. In the spring of 1910 a committee was therefore appointed which examined the system prevailing in American medical schools of granting the degree upon an accumulation of credits in courses, and the European system of two general examina-

tions, the earlier upon the general scientific or laboratory subjects and the final one upon the clinical branches. The committee recommended the adoption of the latter system, and after its provisional approval by the Faculty of Medicine in March of the following year, another committee, mainly of different members, worked out a plan which was adopted by that Faculty in October, 1911.

At first it did not work well, for it was treated too much as a short review of the courses, and produced the meagre results of an examination of that kind. Moreover, the European plan of two distinct examinations, first upon laboratory and later upon clinical subjects, proved to be defective, because one of the main objects of such an examination should be to induce a correlation in the student's mind between these two parts of his professional knowledge, that is, between the basic sciences and the art that depends upon them. Not until after the war was the true significance of the principle appreciated. It was then seen that if the examination was to be general the questions must be general also, demanding an application of some portion of the laboratory sciences to the facts of disease. Of late years this has been done by a single general examination, partly written and partly oral, that closes the four years of study in the school; and it has become a real standard of achievement, fixing the attention of the students on the true aim of their work, and affecting to no small extent the teaching of the courses throughout. Curiously enough, while both the new plan of admission to college and the system of a general examination and tutors for undergraduates have been very widely adopted by colleges with problems akin to ours, the final examination in medicine, although for some years highly successful, has not yet been followed by any other medical school.

Shortly after its adoption in the medical school the idea of a general examination invaded departments at Cambridge. In the academic year 1911–12 it was adopted in the Divinity School for the degrees of Bachelor and Master of Theology; and in this case it seems to have worked well from the start.

Meanwhile the division of History, Government and Economics had been considering the matter, and after a year of careful study formulated a plan which was sanctioned by the Faculty of Arts and Sciences in the winter of 1912–13. The examination was to be conducted by the division and in fact by a committee of three of its members appointed by the president, who were to be relieved of one-half of their work of instruction. It was to consist of both written and oral tests, was to be required of all college students concentrating in that division, in addition to their courses, and was to go into effect with the class entering the following autumn. Authority was also given to supplement by tutorial assistance the instruction given in the courses. Thus the complete system of a general examination and tutors was set up for all undergraduates in one division, and the one which at the time had the largest number of concentrators.

The plan was put into effect without serious obstacles. The number of students concentrating in these subjects did, indeed, diminish, the weaker or more timid seeking departments where no such examination barred the way; but that was no harm, and proved to be in large part a temporary effect. The preparing of examination questions, which had been supposed very difficult, was exceedingly well done by an able committee. Yet the plan was not at once wholly successful. Tutorial work was new, and men equipped for it were not to be found. They had to learn the art by their own experience, and by what they derived from an exchange of tutors for a year with Oxford and Cambridge. In fact, after a few years of trial the plan seemed in danger of breaking down. The benefits were not at once evident, some of those formerly in favor of it became skeptical, while opponents were confirmed in their opinions. Until we entered the World War the only other field of concentration which had adopted a general examination of all students for graduation was that of History and Literature, although something of the kind had long been in common use in the case of candidates for distinction or honors.

The crisis came at the close of the war, when the changes

made for military purposes in all instruction had left matters in a somewhat fluid state. A committee of the faculty was appointed to consider what, if any, extension of the principle could profitably be made in other fields. There was a feeling that such a system ought not to be maintained in one class of subjects alone; that it should either be abolished or extended. After a study of the question in its various phases the committee reported, and in April, 1919, the faculty voted, that general examinations should "be established for all students concentrating in divisions or under committees which signify their willingness to try such examinations," and that they "be employed for the members of the present freshman class." Thereupon all the divisions under the faculty, except those dealing with mathematics and the natural sciences, decided to make the experiment. Some of them did so reluctantly, with misgiving, and under a condition that they should not be obliged to employ tutors. The plan of allowing each department or division to decide upon its own policy in so highly novel a matter was certainly wise, for it stimulated experimentation and made for permanent conviction. The system as a whole could be trusted to demonstrate its own merit, and did so. The divisions that set up a general examination without tutors found their students complaining that they were required to do a difficult thing without guidance, and the proportion of men who graduated with distinction was markedly lower than in the departments which had both general examination and tutors. By the academic year 1924–25, therefore, the students in all the divisions with a general examination had the benefit of tutoring.

Since that time the progress of the system has been gradual but continuous. Two years ago the department of mathematics decided to adopt it, and a year later biology and biological chemistry followed its example; leaving chemistry and physics as the only departments with a large number of concentrators that still retain the older methods, and their work is done so much in laboratories that their position is peculiar. The only change in the system has

come from a demand by the students themselves. We have not desired to abandon teaching or examination in courses by copying the practice at Oxford and Cambridge of leaving instruction wholly to the tutor, save for such attendance at series of lectures as he may direct. That seems ill-adapted to our habits, and involves a loss of the valuable elements in course instruction. Nor on the part of the undergraduates has there been complaint of the burden of preparing for the general, or as they call them "divisional," examinations in addition to the work in courses, except in the case of candidates for distinction. These men are required to prepare theses that take much time, and for them a lightening of the course work has been asked. The faculty, therefore, decided to permit, for such of these candidates as are recommended by the department and the dean, a reduction of two courses in all, one of which may be in the junior, or both in the senior year. The privilege has been granted sparingly, solely for the purpose of freeing time to be used for personal study and writing under the guidance of the tutor.

OPERATION OF THE SYSTEM

THE GENERAL EXAMINATION

Not many years ago examinations were anathema over a large part of the country. Some teachers felt that they knew the progress of their pupils, and did not see the need of subjecting them to tests. An examination was often regarded as a reflection upon the pupil, and, if set by a stranger, upon the teacher also. It implied a doubt whether the instruction had given all that it purported to impart; it suggested a suspicion that taking a course diligently did not mean learning the subject taught. For pupils whose work had not been satisfactory it might serve as a discipline, but for the good scholars it was almost an indignity. It was like indicting an honorable man, and making him prove his innocence. Moreover, it distracted the attention of both teacher and pupil from the real object of education, turning it to preparation for an artificial performance, making the teacher a crammer and the pupil a learner of tricks.

This conception of examinations has not been disproved, but it is being outgrown. Numerous conditions that might fill a treatise have brought a demand for the measurement of young people, for their classification in groups according to their natural capacity, their attainments, and their prospects. These have given rise to various kinds of tests, until educational thought and experiment have become deeply concerned with the subject of examinations. We hear much of intelligence tests based upon native ability, of aptitude tests, and of the new kind of examinations, where a large number of questions are given, to be marked rapidly Yes or No. These last, it is claimed, are more searching, more accurate, and more comparable than the older form of curricular questions in common use. Whether they will prove to be better or not for their purpose will be watched with interest, for it is highly important. But the excellence of any examination depends upon the degree in which it fulfills the object for which it is designed; and the intent of a general examination upon the main subject of a student's work in college is to ascertain not so much the amount of his knowledge as the use he can make of it; to measure his grasp, his power of thought, the extent to which his studies have moulded the fabric of his mind; in short, how far he has in that field become an educated man.

The aim of the system adopted here being the mastery of some subject as a whole, to be acquired so far as possible by the student's own work, a general final examination is needed to measure his attainment and still more to set a standard for achievement. This is the essential element, the foundation of the entire system on which all the rest is based; but in fact its importance is sometimes overlooked, because the tutoring, the frequent contacts with the students which it involves, and the personal influence of the tutors themselves, attract more attention. Yet it is the examination that marks out the goal for both tutors and students. Without it the system, except for a few undergraduates of exceptional scholarly tastes, would be like a football game without goal posts, or would degenerate into little more than

tutoring in courses and lose its real significance. A general examination that was easy or superficial would hamper the tutors in doing their best work; one that was eccentric or unfair would discourage both them and their pupils; one that required only a memory of facts would make it hard for both to devote energy to the deeper relations of the subjects studied. The nature of the examination, therefore, determines the character and effectiveness of the whole system, and it is both the essential and the most difficult part thereof. The object is to enable the candidates to display their command of the subject and cause them to expose their ignorance, and this in the case of those who have much, or only a moderate amount, of either. To prepare such an examination is an exceedingly difficult task, requiring much time and labor, wherefore it is important that in the departments with a large number of students the examiners should be relieved from a part of their other work; and in the division that has had the longest experience with the system here, a single examiner in each of the three subjects comprised is excused from one half of his teaching.

Both written and oral examinations are used by almost all the examining committees, each being at liberty to apply them in accord with its own experience of their value. In fact the practice has varied, but the present tendency is to limit the oral to candidates for distinction and to students who on the written papers do not clearly earn a degree, it being thought a waste of time to give an oral examination in cases where it will have no effect upon the result. The number of written papers and the length of the oral vary. The division with the longest experience has three written examinations of three hours each, and others which have less are likely to find that an increase of their papers will improve the value of their tests. In the subjects taken by the largest number of students, history, government and economics, ancient and modern languages, and history and literature, there are papers on both general and special fields. In history, government, or economics, for example, every candidate for a degree must take an examination of a general

character in the two subjects in which his principal work does not lie, a second examination covering in more detail the one in which it does lie, and a third, more searching, on his special field therein. In the literary subjects every man, before trying the paper on his own field, must take an examination on the Bible and Shakespeare, and another on two modern authors if his field is classics, or on two ancient ones if his field is modern literature; the moderns being allowed to read the classic authors in translations, the classical students having the same privilege for some modern books in the less familiar languages. Candidates for distinction are usually required also to write theses, on which much labor is often expended. These are, in fact, most important in determining the grade of honors awarded. They may reach a high grade of excellence, and although far less elaborate than theses for the doctorate of philosophy, they are sometimes quite equal in quality.

The committee that prepares the examination must consider many things. It must maintain satisfactory relations with the instructors in courses and with the tutors. While, on the one hand, it must use its own judgment on the ground to be covered and the nature of the questions to be asked, it cannot, on the other hand, disregard entirely the content of the courses. They are part of the instruction offered by the faculty and should be regarded as within the field included by the examination. This is true also of the work of the tutors, in the sense that they must be aware of the scope of the examination and the kind of question that will be set. The committee, therefore, cannot properly widen the field without warning to them. Students have a right to rely on them for advice about their reading and it would be demoralizing to conduct examinations so that tutors cannot give it. Yet the committee is naturally and properly testing the work, not only of the students, but also of the instructors, and especially of the tutors. For these last it must set a standard and by them it is likely to be thought a little severe. The scope of course instruction is in fact enlarged by the tutors, and the examiners require a more symmetrical

and well-rounded preparation than course instruction alone would give. Moreover, it may be noted that the material with which to prepare for the examination must be accessible to the students. It must be in books. Undergraduates cannot be expected to make their preparation a matter of research.

The foregoing comes from the experience of the division that has longest used the general examination; as does also the following discussion how far the questions should measure a knowledge of facts and how far call for analytical or judicial capacity. To prepare a long list of things every student should know makes the tutor a coach; and while an occasional informational question may be necessary to expose the loafers, the main part of the test should involve the exercise of judgment. Facts should be required, but not facts for their own sake. The object should be to measure grasp, the power to deal with facts; and a question demanding a real grasp of a subject cannot be answered without an adequate knowledge of the facts with which it deals. The best opportunity to show judgment in dealing with a large subject seems to be given by a question that demands an essay, and one such essay at least should be required. But to find suitable topics for essays is among the hardest tasks of the examiner. If the question is too narrow, it does not give a chance to enough men; if too broad, there is encouragement to thin generalizations. The wise course seems to be to give fairly wide options among fairly specific subjects. Yet carelessness in the use of options may unwittingly affect the entire character of a paper by enabling a man to pass on a very narrow accomplishment. To arouse the student, a question that sharply challenges accepted opinion is sometimes useful. In this way the call for comment upon a quotation often serves. The danger here is irrelevance in the reply. Plenty of time must be given and responsiveness insisted upon.

There is a perennial question whether separate papers should be set for distinction and pass men. The strong argument against separate papers is that they mean separate preparations, and this means inability to encourage the

able man who makes up his mind to try for distinction late in his college course. A better solution would seem to be an added paper for distinction candidates, or, better still, added questions on the regular papers. Groups of questions are frequently set from which distinction candidates must, and others may, make a choice.

These remarks, mainly drawn from a report by examiners in History, Government and Economics, may be regarded as fairly typical of the difficulties in setting a fair and searching examination, and the methods adopted for meeting them. A few sample questions in History and English, in the form of quotations requiring something in the nature of essays, will illustrate what is done. They are taken from the papers of June, 1926.

Mediaeval History

6. "In the period which followed the Germanic conquests, by far the most decisive influence was the alliance of the papacy with the Franks; it was, indeed, one of the most eventful coalitions ever entered into in history." Explain.

History of the Renaissance

5. "For a variety of reasons the sixteenth century was monarchical in mind as the twentieth century is democratic."

Modern France

10. "Napoleon's work was to fuse the old France with the new." Explain.

American History

1. "The central problem of the American Revolution was the true constitution of the Empire."

English Literature

"Show by an analysis of the content, style, and diction of three of the following passages, in what ways they are characteristic of (*a*) their authors, (*b*) the times in which they were written."

Then follow passages of about 25 lines from Swift, Wordsworth, Ascham, and H. G. Wells.

The general examination increases not only the work required of the student, but also the danger of his losing his degree, and this is no imaginary peril. The records of the last two years show that in 1924–25 there were 577

candidates for graduation in all the departments having such an examination, and that 518 passed it, while 59, or 10.2 per cent, failed. In 1925–26 out of 549 candidates 508 passed, and 41, or 5.5 per cent, failed; the smaller proportion of failures being largely due to the adoption of tutors by the departments of modern languages. Of those who fail a number try again in a later year and many of them succeed in passing. Of the men failing at first about one half pass a subsequent examination.

THE TUTORS

Lacking guidance on his way, the undergraduate would be at a loss to supply the gaps between his courses, to connect them, to fill in the background and survey the whole subject. For that purpose the tutors are provided. As soon as the student, at the end of his freshman year, has selected his subject of concentration he is assigned to a tutor in that field who becomes thenceforth his adviser in all his studies. Looked at from the standpoint of academic organization, the function of the tutor is to help the student to cope with the general examination; not by coaching or cramming—for an examination that could be passed by such means would have quite failed in its object—but by making him competent to pass it. Looked at from its effect upon the pupil, the purpose of the tutor is to lead him to educate himself by a thorough study of his chosen subject; and, if the system works as it should, these two points of view are in fact two aspects of the same design from different sides, two ways of stating the same thing. There is always the danger that the tutor may degenerate into a coach, carrying his pupil instead of guiding him, saving him effort instead of stimulating him to effort; and that danger must always be watched, but so far it has not shown itself here.

In describing the work of the tutor it must be borne in mind that the office means a function, not an academic grade. In most of the departments it has been necessary at the outset to assign tutorial duties to young men. Whatever their capacity, old dogs are usually disinclined to

learn new tricks. But as the young tutors have grown older, they have been promoted at the same rate as those who have been teaching in courses, until the tutors hold positions all the way from that of assistant or instructor, to that of full professor; and such is the declared policy of the university. Some of the older professors have, indeed, preferred to use part of their time as tutors; and this is done by the whole department of mathematics. Tutoring is one form of teaching, not less difficult or honorable than conducting a course. In fact, a large part of the tutors do both; a rough survey of the departments indicates that at least one-half of the tutors are also giving courses, and the proportion is tending to increase. In one of the subjects of concentration the head tutor thinks it desirable that every tutor should do so, not only for the stimulus to himself from teaching a course, but also because he believes that a man cannot know thoroughly the different mentalities of over fifteen pupils at the same time, and therefore should not have charge of more. At present the number of pupils to a tutor who devotes his whole time to this work runs from about twenty-five to forty-five, the general opinion being that the smaller of these numbers is not far from right.

The length and frequency of conferences with the tutor varies in the different departments. Sometimes they last only half or three-quarters of an hour, but more commonly an hour is assigned for the purpose. In a few subjects the conferences for the sophomores come less often than once in two weeks, but that is only in the smaller departments; the usual practice is once a week or fortnight for the sophomores and once a week for the juniors and seniors. But there is much diversity, and, in fact, the meetings with the tutors are more frequent than any rules prescribe, especially in the case of candidates for distinction who are writing theses and are constantly seeking advice at odd times. Normally the students meet their tutors singly, but in some cases it has been found advantageous for them to meet in pairs or in groups of three to five. The departments are experimenting, and the individual tutors are allowed no small latitude, for

much depends upon the personal quality of the students to be tutored.

The conferences with the tutor are by no means for the purpose of giving information; they are not in the nature of private lectures. Their object is to help the student to work out for himself the subjects that he is studying, and experience shows that the less the tutor talks, the better. He rather helps the pupil to work out his own difficulties. In short, the process is Socratic, not didactic. Moreover, it has as little to do as possible with the ground covered in the courses the student has taken. Sometimes, where the student has failed to grasp the subject of a course, it may be necessary to explain it to him; but in the main the courses are used, if at all, as bases for departure in other directions, or as fixed points to be connected in the field to be covered. In this the tutors seem to be almost universally agreed. The attempt to enlarge, complete, and, from various points of view, illuminate the field involves, of course, much reading quite outside the courses; and it has been found that one of the effective methods is to require the student to write a report upon the book or subject on which he has been at work, and discuss it with the tutor. These reports have been found very valuable, and their use has been increasing. Not only have they proved a valuable means of helping the student to a command of his subject, but one of the examiners reports that they have distinctly improved the quality of English composition as seen in the general examination.

The relation of the tutor to his pupil is peculiar, differing from any other in the college. It is that of a teacher, but not a teacher who sets examinations or gives marks. Nor is he supported by college discipline. Failure to attend the conferences he assigns is not reported to the dean's office; and although the tutor has a right to prevent a pupil who has been grossly neglecting his work from trying the general examination, it has never been exercised. Failure to attend conferences was formerly not uncommon; but it has steadily diminished, partly, no doubt, because in preparing for the general examination the need of the tutor has come to be

felt, and partly, it may be assumed, from the cordial relation that has grown up between tutor and pupil. The former is there to help the student as his guide and friend, and he is generally so regarded. His object is to develop the willing pupil, and provoke the listless to an interest in his subject. All this he could not do unless he was himself personally interested in his pupils. Naturally that is most obvious in the case of candidates for distinction, and the eagerness of the tutors that these men should succeed, and win as high a grade of honors as possible, is the more valuable because that spirit is caught by the pupils.

The system is tending to produce a broader type of tutor. Since he has to cover more ground with his students than the man who gives courses on his own chosen parts of a subject, he must keep up with a wider field, a fact that has manifest advantages. But after all, the system is still new, for we do not, and cannot wisely, copy the models of Oxford and Cambridge, but must seek to adapt to our conditions such methods as will make with our own a consistent whole. Every tutor is therefore very free to work in the way he finds most profitable for each student under his charge. Yet to compare experiences, to talk over their common problems, and to improve their methods, it is the custom of the tutors in the various divisions or departments to meet at luncheon every week or two for consultation. This is welding their work into an organic system.

EFFECTS OF THE SYSTEM

Before trying to judge the effect of the tutors and the general examination it is well to have clearly in mind the objects they are designed to attain. These are: to devote more attention to the undergraduate as an individual; to treat him as a whole being; to make him more largely educate himself; and to provoke in him an interest in so doing. The first of these hardly needs explanation. The former conception, drawn from Germany, that the function of a university is to provide wide opportunities for education,

of which the student may or may not take advantage, as he pleases, is passing into the background in America. Everywhere more attention is being given to the individual student, and that the tutor is a highly effective means to this end is self-evident.

The meaning of treating the student as a whole is not so clear. Owing to the process by which the elective system grew up, gradually substituting more and more electives for required courses, the course became the unit in education and a fixed number of credits in courses became the qualification for graduation. This was true whether the election was unlimited or restricted by certain rules of choice; and it was true both of colleges and of lower schools, so that in some form counting by credits became well-nigh universal in American education. It is a bad plan, because it measures by the process that has been gone through instead of by the result. It is bad also in making the course the unit in education when, in fact, there can be only one real unit—that is, the student himself. The course is merely a means to an end—the education of the student; and he is an end. The object of his education is himself, and that not as a conglomeration of intellectual fragments, but as a whole. The important thing is what he has become. Such a purpose would be most fully achieved if someone were omniscient enough to have the oversight of an undergraduate in all his studies; but this is impossible; and certainly, to have a tutor in a large field in which his principal work is done is far nearer to treating the intellectual life of the student as a whole than any system of courses can be; and, in fact, it does have that effect.

The third object mentioned—that of making the student more largely educate himself—is a highly important one. All true education above rudimentary, mechanical training is in the main self-education with assistance, under guidance and stimulation. The tutor can help, but he cannot supply the place of effort on the part of the student. Massage does not take the place of exercise in developing strength—a truth

that applies not only to the learning of a definite subject, but still more to preparation for the battle of life. So far has this been forgotten that to the public, and probably to most members of the teaching profession, the words "education" and "instruction" are synonymous; whereas in fact instruction is a means, and only one means, to education. For that reason there has been a tendency to teach too much and study too little. What we need is to provoke personal thought as compared with receptivity, and this is exactly the function of the tutor. It is his business, not to supply the student with information, but to tell him where he can find it; not to present to him ideas, but to make him work them out himself by reading and discussion—in short, to help the student to educate himself from books and other material within his reach. The chairman of the board of tutors in one of the largest departments reports that in his opinion "the great gain due to the introduction of the general examinations and the tutorial system is twofold: first, the student has been taught to view a field of knowledge as a whole, not as a series of more or less unrelated parts; second, the student has learned through his intimate discussions with his tutor to probe more deeply and independently into his chosen field of knowledge, the result being that he is better able to do work by himself."

The fourth object is to provoke in the student a desire to educate himself, and this must be done by arousing his interest in some subject. It often happens that one loses sight of the end by fixing his attention on the means. So strongly have American educators felt that a student cannot do good work in a subject in which he is not interested that they have been too much inclined to inquire in what he is interested, rather than to interest him in what he had better study. The fact is that most boys and young men have no very strong intellectual interests, and to ask them to select what they would like to study means in many cases a selection of that which they can study with the least effort. In short, the result of a selection according to natural interests

has been in large part a reduction of effort and of the educational value that comes therefrom. To some extent effort will come from an existing interest, but to a much larger extent interest comes from voluntary effort. The normal youth who can be induced to throw his powers vigorously into any intellectual study will find it interesting. That is the function of the tutor. His business is to stimulate effort by interesting, and interest by effort. Partly for this reason, we have applied the system not only to men who at the outset desire to be candidates for honors, but to all students, believing that all of them will obtain a benefit and that many of them, who have the capacity, will achieve a much higher grade of work than they would otherwise do. This may be shown by a table of the increase of candidates for degrees with distinction.

PERCENTAGE OF CANDIDATES FOR DISTINCTION IN SPECIAL FIELDS, JUNE, 1923–26

Year	*Seniors and ocC*[1]	*All Classes*
1923	21.7	23.2
1924	28.0	31.8
1925	30.5	41.0
1926	39.5	47.0

Of course all these men did not win distinction, and the fact that certain privileges relating to absence from classes are accorded to those inscribed as candidates therefor has helped to swell the list. Perhaps a better indication of the effect of the new system may be found in the percentage of men who have actually attained distinction at graduation.

Year	*Degrees awarded omitting War Degrees*	*Degrees with Distinction*		*Degrees with Distinction in Subjects with General Examination*	
		Number	*Percentage*	*Number*	*Percentage*
1922	547	114	20.8	82	15.0
1923	581	139	23.9	111	18.9
1924	584	171	29.3	120	20.5
1925	637	177	27.9	136	21.4
1926	648	184	28.4	143	22.1

[1] ocC means out of course candidates—that is, students who do not take their degree with their class, but are preparing to do so later.

It seems to be the general opinion of the chairmen of the boards of tutors that a very large part, at least, of the increase has been due to the personal influence of the tutors; the chairman of the board in one of the largest departments remarking: "I view the entire increase in the candidacy for distinction as attributable to the new methods of instruction. . . . I think it safe to say that 85 or 90 per cent of the men capable of attaining distinction are now candidates for distinction. Certainly not more than fifteen, and probably not more than ten per cent of the non-distinction candidates for degrees have the ability to do much more than they are now doing." There is no doubt that the students work harder than they did. They have a more definite aim in their work; and it may be remarked also that something of the competitive spirit in their studies has been restored; for they regard the divisional examinations, as they call them, as a better test of ability and true scholarship than the examinations in the separate courses, where they feel that high marks can be more easily obtained by mere diligence and memory.

COST OF THE SYSTEM

The salaries of the tutors amount in the aggregate to a very large sum. In accordance with our practice of charging to a separate tutorial budget in many of the larger departments the salaries of the tutors, with the proportion of the salaries of men giving part time to that form of teaching, it is possible to make an approximate estimate of the cost. For the current year this comes to $173,114. That is certainly a large figure, and if the system had been adopted all at one time it would have been impossible to meet the expense without additional endowment; but in fact it was adopted gradually in one department after another, and therefore it has brought no sudden great increase of expense. Moreover, since—as already stated—the tutors in each department were at first young men, they have begun with comparatively small salaries, which have increased as they

have grown older, and will not reach the normal cost for some time to come.

But the salaries of the tutors are by no means the only element in the problem. The question is not simply what they cost, but the expense of this system as compared with that which it replaced. Such a calculation, however, cannot be properly made in dollars, because all salaries have risen, or, to put it otherwise, the value of money has fallen so much that a comparison of the sums expended is meaningless. A far more accurate comparison is that of the number of students to a member of the instructing staff. This has the double advantage of eliminating the rate of salaries and also of eliminating the question of age, for about the year 1900 there was a large increase in the appointments of young men, and this happened again with the introduction of the tutorial system. In each case the salaries were at first small, but were certain to increase without an increase of numbers in the instructing staff. Taking, therefore, the number of students to an instructor at periods equi-distant, we find for the years 1890–91, 1908–09 and 1926–27 that the numbers of students and of instructing staff, including tutors, were as follows:

Faculty of Arts and Sciences

	Instructing Staff			*Students*		
	In the Faculty	*Instructors not in Faculty*	*Total*	*Harvard College and Specials*	*Graduate Schools*	*Total*
1890–91	67	19	86	1339	110	1449
1908–09	135	53	188	2238	387	2625
1926–27	206	156	362	3329	864	4193

It may be observed that the number of students to an instructor was, in 1890–91, 16.85; in 1908–09, 14; and in 1926–27, 11.6. If the points representing these figures are plotted, it will be found that they fall almost exactly on a straight line. In other words, the rate of increase in the instructing staff to the number of students has been almost continuous, and unaffected by the appointment of tutors. What has in

fact happened is that in the earlier half of this time the aim was to increase the number of courses as largely as the revenues would permit. The ambition of the university and of all its departments was to give as wide an opportunity of instruction, to cover as many fields, as possible; and an increase in the revenue was used to appoint additional instructors and give additional courses. During the later half this idea has changed. It has been felt that it is impossible to cover by courses every part of every branch of knowledge, and that there is no object in so doing. It has been thought that in the main the courses of instruction were sufficient, and the additional revenue from the income of gifts has been used to pay for tutors instead of for additional courses. Looked at from this point of view, it may be said that the tutorial system has cost the university no more than a continuance of the previous policy would have done.

On the other hand, the change of policy has brought a new problem. The students having increased more rapidly than the courses, the number of men in each course has, on the average, become larger; and this in turn has increased the labor of the instructor. Moreover, with the improvement in the education of the students, with their stronger interest in educating themselves and hence their greater proficiency in their subjects, the quality of the courses has become higher, and the demand on the instructor more strenuous. To this must be added the burden from the large growth in the number of graduate students. Meanwhile the tutors also have found that the call upon their time has been distinctly greater than the number of hours they were supposed to devote to conferences. In particular, the candidates for distinction, who are writing theses, drop in upon them at all sorts of odd times, and break into the continuity of their own work. Now, in order to get the best men as lecturers and tutors, we must see that they are not at a disadvantage as compared with those in other places. They should have fully as great an opportunity to keep up with their subject and to make and publish their own con-

tributions to knowledge. During the current year this subject has engaged the attention of the faculty, and, considered from the point of view both of the instructing staff and of the students, a plan has been devised for two periods in which, save for the elementary courses, there shall be neither lecturing nor tutoring, but reading by students on their own account. The first of the periods comes between the Christmas vacation and the mid-year examinations, the second from the seventh or eighth of May to the final examinations. During the latter period, indeed, both the general examinations and the examination of candidates for the doctorate of philosophy will take place, and the tutors' conferences with the seniors, but not with other pupils, will continue. The object of these reading periods is twofold: first, to relieve the work of the instructing staff, which is now believed to be more strenuous than in most colleges, by reducing the teaching period to about its length in a European university; and second, to make the student appreciate more thoroughly the fact that his improvement must come through self-education. For the seniors there will be no difficulty in this regard. The candidates for distinction will be busy with their theses; the others sobered by the terrors of the divisional examinations. On the other hand, the sophomores and juniors are to have reading carefully laid out for them by consultation between the tutors and the instructors whose courses the men are taking; and the mid-year examinations will measure how far the reading has been conscientiously done. No doubt at first some sophomores will not appreciate the importance and gravity of the task, will think they can do their reading in a few days at the end, will fall into mishaps, go on probation or have their probation closed; but that is the inevitable accompaniment of any improvement in education. It may be added that the freshmen, who have no tutors, are not affected, the courses open to them being treated as elementary.

This is certainly a great innovation, but here we are accustomed to innovations. Among the most precious of

our traditions is that of perpetual change. Change means experiment, and experiment means doing things which one does not at first know exactly how to do aright. This plan, which has now received the approval of the governing boards, is another long step in the direction in which the college has for a score of years progressed.

A. LAWRENCE LOWELL.

The Yale Bureau of Appointments

THOUGH glad to comply with the request for an outline of placement procedure at Yale University, I cannot but approach the task with embarrassment at our shortcomings in this field. These observations are accordingly based rather on what we would like to do than on what little we have thus far been able to accomplish. Our industrial placement service growing out of other activities of the Bureau of Appointments is still comparatively in its infancy. It has as yet by no means attained the ideal, well-rounded growth which the needs of our students would warrant, but for the development of which existing facilities are as yet inadequate. Before describing the senior placement procedure it may be of interest to discuss briefly certain other phases of the bureau's work.

1. *Student Employment* embraces all of the work of finding employment for men earning their way and the total registration of this department is about 1,700, of which about 1,400 are "active" in any given year seeking either term-time or vacation work or both. Last year $339,334 was earned by students from work which this department secured for them directly. This involved filling nearly 4,500 different term-time positions divided among about 1,000 students and totaling $225,000 in term-time earnings; while 450 men were placed in summer vacation employment directly through the bureau. This represented 26 per cent of the university enrollment and 81 per cent of the net total "active" registration. Work for board at Commons and at other eating places represents the most important single means of term-time employment, the next most significant being the Student Agencies, a recent development. Local industrial conditions and the comparative inflexibility of our student classroom schedules both make it difficult for students to find regular employment in stores or factories. The student agencies are an attempt to increase opportunities for earning money on the campus, and last year some 350 men earned about $40,000 through these media. Practically every

commodity or service in demand by the university community has now a student agency representative and in certain fields such Agencies have proved very profitable. These maintain regular competitions for election to their Managerial Boards. Another important factor in the recent growth of student earnings at Yale has been the advice and cooperation of leaders in undergraduate activities through the formation of a Student Advisory Council. This gives advice from the undergraduate point of view on expenses, scholarship aid, possible means of earning money, etc., selects managers for certain of the agencies and program privileges, and helps create in general a student attitude favorable to the bureau and its undertakings.

2. *Scholarship and Loan Aid* amounting last year to $254,000 divided among nearly 800 students was administered through this office, which, either directly or through appropriate committees, controls the award of all financial aid to undergraduates and a substantial part of such assistance for graduate and professional students as well. At Yale such aid, while apportioned primarily on the basis of students' scholastic achievement and all-round promise, is in each case largely determined by the individual's financial need. Hence the Bureau of Appointments, which is best able to judge the need and degree of self-support effort of each student, logically directs the selection of scholarship beneficiaries. The general average of all scholarship holders is about 80 (honors), which is excellent considering that these same men must be devoting substantial time and effort to self-support, in order to qualify as well on the ground of financial need for such aid.

3. *Teaching Appointments*.—We maintain a teaching and placement service for seniors and graduate students, as well as for graduates. The number of active registrants in any given year is relatively small, so that the number of teaching positions we fill is only between 125 and 150 each year. Many of these are, however, quite important positions, so that the significance of the service is greater than would be indicated merely by its volume of placements.

4. *Industrial Department.*—This deals with the student's problem of finding the right position upon graduation. As about one-third of our undergraduates are registered with the Bureau of Appointments for self-support employment and such men naturally comprise an even larger proportion of applicants for teaching or industrial positions upon graduation, it follows that such business or teaching placements in many cases are the culmination of four years of personal contact and advice. Nearly half of the graduating senior applicants, however, have not had to work their way and have therefore not previously registered with the bureau. While part-time student employment is offered only to such men as need the earnings to help meet their own expenses, of course no such distinction is made when it comes to placement in full-time positions after graduation. The rapid advance in both the quality and number of students registered with this department of the bureau during the last three years evidences the need for and interest in this service. We are in touch with about 1,200 industrial organizations throughout the country and have positions for over 500 men listed annually for consideration of the senior class. Last year, of 220 seniors registered, 138 or 63 per cent were directly placed by the bureau. Almost every day from before the first of March until late in May we had representatives of one or more companies here interviewing seniors. The information about careers thus obtainable is of real help to many students. Obviously the industrial placement service should be coordinated with a comprehensive student personnel program, for which there is a crying need. This should include really careful analyses of each student's background, equipment, training and inclinations, so that the placement work may become part of a scientific and broadly conceived plan of vocational advisement which is naturally our desired goal.

The university recognizes the responsibility for advising graduating seniors and helping them find their first position. However, the obligation for subsequent replacement is, we feel, on a somewhat different basis, and therefore the place-

ment of graduates who have already left the university is centralized at the Yale Graduate Placement Bureau, Inc., at the Yale Club, New York City, under the able direction of Mr. Samuel S. Board, '11. While no charge is made for any of the service rendered by the university at New Haven through its Bureau of Appointments, the Yale Graduate Placement Bureau is an incorporated organization charging a placement fee (though one somewhat smaller than the regular commercial charge). The work of the Yale Graduate Placement Bureau is coordinated with that of the Bureau of Appointments through university membership on its Board of Directors, which includes representatives of the Undergraduate Faculties, the Bureau of Appointments, the Alumni Advisory Board, the Yale Club of New York City and other graduate organizations. Needless to say, the Yale Graduate Placement Bureau is not organized for profit.

Although we have secured no complete data as to the placement needs of the entire graduating class, a partial survey last year indicated that 37 per cent have definite business positions in view and that 28 per cent expect to continue in graduate or professional schools. This leaves only about 230 men or 35 per cent of the graduating class, who might be expected to register for placement in senior year. Last year 220 seniors, 33 per cent of the class, did so register. The following figures from the director's last annual report give detailed data as to the registration and placement of these men.

INDUSTRIAL PLACEMENT STATISTICS

Nature of Employment	*Number of Men Placed*
Advertising	3
Banking and brokerage	17
Engineering	33
Insurance	10
Mercantile and office work	24
Miscellaneous	1
Production	16
Publicity	3
Sales and sales engineering	17
	124

DISTRIBUTION OF REPORTED INITIAL SALARIES

Salary	*Number of Men*
$1,200–1,300	11
1,300–1,500	42
1,500–1,800	47
1,800–2,000	20
Over 2,000	4
	124

The mean and the median of reported salaries are both approximately $1,400.

REGISTRATION

Registrants:	
College Seniors	90
Sheffield Scientific School Seniors	105
Graduate Students	14
	209
Placements:	
College Seniors	55
Sheffield Scientific School Seniors	65
Graduate Students	4
	134

Percentage of all industrial registrants directly placed—60 per cent.

INDUSTRIAL AND TEACHING PLACEMENTS OF GRADUATING SENIORS

Senior registrants for industrial positions	195
Senior registrants for teaching positions	25
Total Senior registration for positions after graduation	220
Seniors placed in industrial positions	120
Seniors placed in teaching positions	18
Total Seniors placed	138

Percentage of Senior registrants directly placed—63 per cent.

The senior industrial registration begins immediately after the close of the Christmas vacation, and during January and February the emphasis is on personal interviews with applicants. Many students are uncertain as to what positions they wish to secure, and some are in a complete and almost impenetrable fog regarding what to do after graduation. Two interviewers divide these initial conferences and

rate the applicants subjectively on the following traits as judged during the interview: (1) Appearance and personality, (2) willingness and attitude, (3) experience and poise and (4) dependability and care. A subjective combination or summation of each of these four separate ratings is also made. Additional estimates are based objectively upon extra-curriculum achievement, scholastic achievement and mental test classifications. The final rating is simply a combination of the objective and subjective estimates. A seven-point scale is used. Last year the final ratings of the two interviewers agreed as follows for the men who were registered and had been interviewed up to the time of the Easter vacation.

	RATING							
	C—	C	B—	B	B*	A	A*	Total rated
Distribution of first summation ratings given (combination of subjective estimates) by A. B. C.....	0	9	7	14	23	25	7	85
Distribution of first summation ratings given (combination of subjective estimates) by D. W. B.....	0	9	9	13	20	26	4	81
Distribution of final ratings after combining objective criteria (mental test classification, scholastic standing and extra-curriculum activity rating) with the above first summations...	2	8	38	56	28	28	6	166
	2	26	54	83	71	79	17	332

No tabulation of individual ratings assigned was made as the interviewing proceeded so that the conformity and distribution of final summation of subjective estimates was rather surprising. For our own guidance we studied the relative conformity of each of the four subjective criteria rating mentioned above and found close agreement with respect to the first (Appearance and Personality) and third

(Experience and Poise). About 50 more students were rated after this comparison of previously assigned ratings had been made. The distributions show some preponderance of ratings in the first summation distinctly compensated for when the introduction of objective criteria has been made.

The registration blank which seniors fill out before the initial interview has evolved gradually and now appears to serve fairly well both our needs and those of the prospective employers. It gives data concerning the student's scholastic, extra-curriculum and previous employment record (in self-support or otherwise), as well as other personal data on one side; and, on the reverse, additional information more specifically related to the work he is seeking. A comprehensive list of possible occupations for the registrant to choose between has proved useful. In the initial interview we try to ascertain first the extent to which the applicant knows what he wants. He may have quite a definite idea as to the sort of position he seeks. If so, we regard him as practically placed then and there. In most cases he has a general idea that he does or does not want to do thus or so. Then we try to find out how well founded this idea is and upon how much real consideration or knowledge of the occupational opportunities his attitude is based. If he is completely at a loss, we do not attempt to force any sort of decision for the time being. The general procedure is naturally different for the men who know what they want than for those who are undecided. We seldom attempt to unsettle a definite vocational purpose which is already well fixed, though there are occasional cases where it is advisable to do so since the individual appears obviously unsuited for the career which he wishes to follow. Most of the men who have made a definite decision also make a good impression upon prospective employers, so that advice to such men consists largely of helping them to decide which of several offers to accept. Those who are undecided must be helped to analyze themselves, their potentialities and their attitudes towards this or that general type of work. We do not

believe in making these decisions for the men, though frequently they wish us to do so. We try to furnish them with as much information as we have at our disposal (which is certainly all too little), but the responsibility for occupational decision definitely rests with them. We do not believe that our personal impressions or any objective criteria we have yet employed are sufficiently reliable to justify us in relieving students of that responsibility.

The specific media which seem most effective in our placement procedure are employers' interviews and the bulletins issued both to employers and to registrants. We have about 200 firms sending men here in the spring to talk with graduating seniors. Most firms realize the importance of the personal impression made on the senior by the representative, and consequently the caliber of the man visiting is high—frequently one of the chief executives in the company. In most cases such men are usually glad to give general vocational advice and to talk freely and helpfully even with candidates who are not so much interested in the particular company represented as in obtaining specific occupational data. We are afflicted, to be sure, with our share of the less helpful and broad-minded propagandists and zealous pied-pipers who seem to feel that if they can only rope a man they can somehow keep him tied—even to a job which calls for only half of his ability. Such are not invited to return. Many more firms wish to come and talk with our seniors than we can really accommodate, since the time is limited and our quarters are small. That enables us to choose, on the basis of previous experience, information about the particular opportunities, and general attitude of the company and representative so as to limit our contacts to those firms who cooperate most helpfully with us and with our registrants. In certain lines we restrict rather sharply the number of firms for whom interviews are arranged, because if the number of positions largely exceeds the applicants available for and interested in that particular line of work, and no such restriction were made, we would be wasting our time and the employers' and keeping other firms away. We do not

make arrangements for any company that does not furnish us with satisfactory advance information about the position, or whose financial stability is doubtful. The information we require is not very detailed, but occasionally we find firms unwilling or actually unable to give us sufficiently definite knowledge of the opening in question to enable us or the seniors to judge its merits at all. In those circumstances we decline to make recommendations.

The firms arrange in advance, then, for their interview dates and furnish us with a simple outline of the position, salary offered, nature of work, etc., which enables the registrants to judge which representatives they wish to see. Each week the registrants are sent a list of the following week's interview dates, and they come in and make appointments to see those representatives with whom they wish to talk. Usually from twenty to thirty men will sign up to see each firm; and if two or three such firms are here on the same day, part of the Bureau of Appointments staff have to move out into the back yard and the rest soon seek the nearest asylum. The seniors are usually anxious to talk with as many firms as possible and are quite enthusiastic about this means of securing vocational information. Many of the men registered with us would probably have no difficulty in "finding a job." We feel that the opportunity to acquire occupational information through many such interviews, and consequently to make their ultimate decision upon the basis of sounder criteria than they would otherwise have, is in fact to the senior the most valuable part of the placement service. Unfortunately our facilities have not enabled us to make any sufficiently thorough follow-up study to confirm our impressions objectively, but we believe that the placements effected by the present method are considerably more stable than they would be without such series of personal interviews. The student's own approval is evident from the number of firms most of them want to talk with each year and the increasing proportion of registrants which has more than doubled in the last four years—as has also the number of firms sending representatives here for such interviews.

The bulletin already referred to has proved an effective medium for stimulating interest in men on the one side and in jobs on the other. We started the bulletins descriptive of registrants before we began to develop the campus interview procedure and found that such bulletins, listing individual registrants and their records classified by key numbers, produced a much larger proportion of inquiries and offerings than did any other circulars or even personal letters of a general nature. Two years ago, after the employers had begun to come to us in considerable numbers, we began using a similar bulletin descriptive of positions for the men. In fact the mere scheduling of specific appointments totaling nearly 3,000 in number during the spring months and making the occupational data available to the men and the registrants' records to the employer, in each case, is in itself no small task. Therefore we are forced to rely more and more on the self-service procedure with reference to interviews. That is, we usually do not pick out from our registrants a list of men whom we should recommend to the employer, or vice versa. By bulletining both parties we have the employers notify us of men in whose records they are particularly interested, and the men tell us of jobs which they wish to look into, so that much of the pre-selection for such interviews becomes relatively automatic. For certain special positions, of course, we may spend considerable time upon pre-selection and specific recommendations, but in the majority of cases this is neither necessary nor desirable initially. After the contacts have been established, however, we discuss at considerable length the apparent suitability of men for specific positions, and vice versa. Our first question is that of providing means of contact, largely without advice by us; the guidance—such as it is—comes later.

Gradually, then, the senior arrives at his occupation decision on the basis, first, of preliminary interviews concerning the general nature of the work he wants and later, after more specific interviews, as to what particular job he wants. We encourage the wholly undecided man to talk

with a number of firms for at least a month, before even trying to make any decision, because his apparent purposelessness is usually due to such a genuine lack of occupational data that it is obviously impossible for him to narrow his choice until he has developed more of a background of information.

It is apparent from all this that the placement procedure at Yale is still largely of a hit-or-miss nature. It is fairly effective in actual percentage of registrants placed and as judged by the attitude of students towards it—a fair index, since it is partly dependent upon the reactions of preceding classes. Its real effectiveness however is not known because we have not had facilities for following up the results of our own work. In fact, the industrial placement service has been developed and grafted on to the other functions of the Bureau of Appointments without any special appropriation for the purpose and consequently has been handicapped by lack of funds. That is one reason why we have not experimented more with objective tests, rating technique, etc., and why we have developed so little vocational guidance proper. The Freshman Year Councillor system is probably the only present mechanism at Yale which could be regarded as potentially a nucleus for orientation and guidance. This councillor system, however, is part of The Freshman Year set-up and in no way related to the Bureau of Appointments. We have no central personnel organization at Yale and no cumulative record system, so that we have to start from scratch in our placement procedure in the senior year, except for the men who have been working their way through college. That is one important reason why we feel unjustified in offering guidance and why we are unwilling to advise students more than we do, concerning their fitness for one or another career.

We realize how largely deficient the procedure described is, with respect to both of the essentials upon which wise guidance and placement necessarily depend. We do not know nearly as much as we ought to about either the man or the job.

The Bureau of Appointments is not by any means, however, a full-fledged personnel office and has not the advantage of cumulative records which such an office can develop. We are still merely an employment bureau, and, in order to secure all the data about registrants which we want, it is necessary to collect it here and there from various other offices. Many institutions have excellent centralized records and personnel facilities and thus can more readily evaluate the qualifications of individuals than we can. But in respect to knowledge of opportunities, all placement and personnel bureaus are, equally with us, still working largely in the dark. More accurate estimates of individuals will doubtless follow eventual centralization of all personnel functions and adoption of a cumulative record system for all students. The experience and accomplishments of other universities can guide us here, whenever funds are provided to meet this obvious need. But the other necessity—dependable occupational information of the kind we and our students want—offers a far harder problem. Such data are—at least so far as we know—not today available. Their collection involves a long and arduous quest and one which can probably best be attempted by cooperative effort. To that end, officers of the university and of the Yale Graduate Placement Bureau, Inc., have outlined a tentative program for a series of occupational monographs, in the hope of stimulating interest towards attack of this problem. This has been brought to the attention of the American Council on Education, the Association of Eastern College Personnel Officers, the American Management Association, and the National Association of Appointment Secretaries, etc., in the hope that the program suggested may be sponsored by one or more of such organizations and definite plans laid for its development. We believe that improvement of guidance and placement procedure necessitates a series of studies all made on a *uniform and comparable basis* and following a predetermined pattern. Such information as is already available is neither so codified as to permit of comparative analysis nor particularly reliable. Along many lines it is very incom-

plete and in almost none does it include all of the data that the college student properly seeks. We believe that, for each business and professional career of interest to the college man, certain information should be collected, of which the following is a condensed outline:

1. General description of the occupation, its historical development, its present status and relation to other occupations; its social advantages and handicaps.

2. A functional job-analysis outlining the work actually to be done in successive stages and various divisions of the occupation. Emphasis should be placed upon objective factual data rather than on subjective opinions, i. e., on the work to be done rather than supposed characteristics of the individuals required to do it. The more carefully, definitely and frankly these job specifications can be worked out for a given career, the more effective will be the exposition in behalf of that career.

3. The place of the college man in the occupation. Relative proportion of college men heretofore, and present trends in this respect. The proportionate representation of college men at different levels and in different types of work. Typical method of assimilation of college graduate and opportunities offered for his orientation and training, initially and at successive critical levels.

4. *Salary schedules.* A statistical study based on previous experience, giving median salary and salary ranges for the occupation as a whole and for college men separately, taking cross sections at such temporal stages as: starting point, end of one year, end of three years, end of five years, end of ten years. Salary *predictions based on past experience* in different occupations, while involving no promises for the future, will offer an opportunity for comparative analysis and establish criteria by which both men and their employers may better judge what is a successful rate of progression. Probably no occupational data are more vitally needed today than this.

5. *Desirable training and characteristics.* Specific physical or mental qualities of importance in a given career (this refers to special traits and not to general moral qualities which today clutter up much of the so-called vocational literature); training requisite for general advancement in the occupation or for special types of work therein, practical experience of value and facilities for obtaining such experience through try-out employment, vacation work, etc.; training offered within the occupation; advantages of advanced specialized study beyond the undergraduate courses.

We hope that a cooperative group representing various colleges may first determine in greater detail and better than we have done, just what sort of information is desired. The

mechanism of collecting it (once the pattern or outline of what we want has been determined) would be to secure the cooperation of industrial and professional authorities, by whom alone such data can be furnished. We can write our specifications as to what information we want, but only the different companies, associated groups and professional bodies can fill in the outlines for us completely and reliably. The collection and correlation of the data should be made by trained investigators working under the general direction of a committee representing the cooperative bodies.

Placement technique still really differs but little from the old grab-bag system, except perhaps for the size and number of the bags. Better means of judging registrants are already being developed at various institutions, and we hope that the other need will eventually be supplied, through such a plan as outlined, for the collection of reliable data concerning occupations. Until these essential bases for guidance have both been further improved and facilities for experimental investigation and follow-up analyses provided, we shall all continue to work on a rather elementary level. Meanwhile at Yale we recognize our shortcomings so strongly that we feel it is unwise to attempt definite vocational guidance without first establishing more satisfactory criteria. Hence we act largely as an impersonal intermediary between prospective employer and employee, leaving the responsibility of choice to the specifically interested parties. Even were the data at our disposal and the technique of guidance methods far more reliably developed, however, I doubt if we should wish to relieve the individual of responsibility for his own choice. The more reliable, complete and objective data we can put into the hands of both prospective employer and applicant indeed, the more confidently can this responsibility be placed not upon the adviser, but upon the student, where it belongs.

A. B. CRAWFORD.

Evaluation of Orientation Course At Minnesota

THE ORIENTATION course was introduced at the University of Minnesota in 1923–24. It was built from the ground up by an enthusiastic and hard working committee believing in the need for and the value of a survey course for freshmen covering the fields of natural and social science. This is not the occasion for attempting to set forth in detail the aims or content of the course. Briefly, the general aims, as set forth in the Arts College bulletin, are: A course intended to orient the student in the world of nature, and of organized society, and to arouse in him a consciousness of his relationships and a realization of his responsibilities. The content covers the following fields during two quarters meeting five hours a week; Astronomy, Structural Geology, Historical Geology, Biology and Eugenics, Psychology, Social Origins, Geography, Economic Order, Political Order, and Cultural Expression and the Fine Arts.

This course is unique in the fact that from its inception in 1923 every effort has been made to plan the conduct of the course experimentally so that quantitative evaluations of various procedures would be possible. From the outset I have served as "research member" of the staff and wish to take this opportunity of acknowledging the kindly cooperation of each member of the staff in affording this unusual research opportunity.

In organizing the material for this report I found it difficult to subordinate the mass of detail involving a multitude of correlation coefficients and to bring out in relief the main trend of the results. This difficulty was due not only to the detail but also to the number of problems attacked. Still further difficulty arises because much of the research bears directly on phases of the course administration having only local significance.

Perhaps a mere statement of the main problems attacked along with some of the more outstanding results will best serve our purpose.

PROBLEMS ANALYZED

1. *Predictive Devices.*—Can so-called intelligence tests and placement tests be used for predicting in advance the most probable achievement of individual students in the course?

2. *Examining Devices.*—What is the most reliable and valid method of measuring achievement in the course? The question is directed toward the relative merits of objective examinations and essay examinations. A further question has to do with the determination of the maximum reliability possible in our examining procedures.

3. *Grading System.*—To what extent does the grading method reward merit according to the actual distribution of ability among the students? To what extent are the standards set up adhered to from year to year?

4. *Measuring Progress.*—Can we measure improvement in range of information and knowledge of principles as a result of six months instruction? Is the improvement so measured markedly in evidence?

5. *Measuring Extent and Causes of Student Elimination.*—To what degree does the course hold its students throughout the two quarters? Is lack of capacity a major factor in elimination?

6. *Motivation.*—Are the students motivated to work up to their maximum capacity?

7. *Sectioning on Basis of Ability.*—Does sectioning students into homogeneous ability groups result in increasing the effectiveness of instruction for bright, mediocre, or dull students?

8. *Effect of Size of Sections.*—Is size of class a factor affecting the effectiveness of instruction?

9. *Student Opinions and Aptitudes.*—To what extent do students hold favorable or unfavorable attitudes toward instructors, course content, and class methods? To what extent do the students place their stamp of approval upon

the objectives of the course? Do they believe those objectives are realized?

At the outset permit me to state that all of these questions have not been definitely answered as yet, nor have all of the available data been squeezed dry in the attempt to answer the questions, In other words, our three years collection of data is still in process of analysis.

Predictive Devices.—Using the Minnesota College Ability Tests and a specially constructed Orientation Information Placement examination, we can predict achievement at the end of the first quarter or at the end of the second quarter with a fair degree of accuracy. Generally speaking the correlations range between +0.45 and +0.60. A combination of both devices does not yield a better prediction than either one alone because of the high intercorrelation between them. We may consider the prediction to be surprisingly well done in view of the fact that we are predicting achievement in a single course in which there is fluctuation in individual student's achievement from one quarter to the next. It has been apparent that the prediction is sufficiently close to warrant sectioning the students into homogeneous groups at the beginning of the course.

Examining Devices.—One of the first problems attacked experimentally was that regarding the comparative reliability and validity of new type versus old type examinations. The method of systematic alternation of new and old type examinations throughout both quarters was used. Many members of the staff believed at the outset that the new type examinations measured chiefly mere information or memory, and that the old type examinations measured reasoning ability. The results bearing on this point were published in *School and Society*, August 21, 1926, and may be summarized by saying that both types of examination appear to be measuring the same mental functions. The advantage of greater reliability is clearly shown for the new type objective examinations. Furthermore, by comparing each type of examination with final grades in the course the new type examinations prove to be more valid. As a result of these

findings the staff has adopted the policy of using new type examinations almost exclusively. Thus, objectivity of grading is assured. The efforts of the staff continue to be directed toward further improvements in the examining materials devised for the course.

Grading System.—The method of using new type examinations insures that grades will be awarded in conformity with the measured abilities of the students. The question of adherence to standards set up is of local concern only, hence will not be discussed in this paper.

Measuring Progress.—Since no one knows how much improvement we should expect as a result of six months instruction, we were forced to measure improvement in a rather arbitrary manner. We have done so by giving the Orientation Information Placement Test at the end of six months instruction as well as the beginning of the course and noting the increase in raw scores. The average score at the beginning of the course is in the neighborhood of 55 points with a standard deviation of 17 points. The average score at the end of the course is about 95 points with the same standard deviation. In spite of this marked improvement the correlation between beginning and end is about +0.77. This means that the whole group moves up on the scale each individual tending to maintain his rank within the group. This is another confirmation of the general principle of the high correlation between initial and final status in learning experiments. Analysis of the correlation scatter graphs brings out some interesting comparisons. About 2 per cent of the students know as much on the first day of the course as the average student knows after six months instruction. On the other hand, practically all of the students who survive for two quarters know as much at the end as does the average student at the beginning. There are also instances of little or no improvement as a result of six months instruction as well as instances of very marked improvement.

One other point is worth noting here; namely, the lack of correlation between intelligence test scores and points gained in the information test. We interpret this fact by saying

that profit from the course is not confined to the brighter students alone but rather that all levels of ability seem to be profiting to about the same extent. This seems to indicate that the course is adjusted surprisingly well to the range of talent registered in the course.

Retention and Elimination.—A check on retention and elimination of students during the two quarters is being made systematically. The resulting information is of value in estimating the probable shrinkage from one quarter to another thus enabling the administration to utilize its instructional staff more economically. The figures will have increasing significance as a rough measure of student morale in the course. So far the shrinkage is about 30 per cent and seems to be caused chiefly by initial lack of sufficient intellectual capacity to survive the failing standards set up.

Motivation.—Since one of the objectives of the course is to stimulate the imagination and to arouse intellectual enthusiasm of students at the outset of their college careers, it is important that we devise ways and means of estimating the degree to which the students are motivated to work up to the limit of their capacity. The best index so far available seems to be the size of the correlation between intelligence test scores and final grades earned in the course. Theoretically, if our intelligence tests are reliable and valid academic aptitude tests, then the correlation between intelligence scores and achievement in the course should approach unity as we succeed in motivating each student to do his very best. This presupposes that achievement is likewise measured accurately. We have a highly reliable set of intelligence tests and we are measuring achievement as objectively and reliably as we know how. On the basis of Crawford's work at Yale and much other work in the field of measurement, it would seem that we are justified in using the correlation between intelligence and achievement as an index of motivation. In summarizing the results we note that the correlation is higher for this course than for the usual run of freshmen courses. This would indicate a healthy state of affairs. Analyzing the figures more closely,

we note that for each of three years the correlation is lower for the second quarter than for the first quarter. This would indicate a possible let-down in effort as the students pass from the natural sciences to the social sciences. Student attitudes toward the work of the two quarters suggests this since there is a strong trend toward a decided preference for the work of the first quarter. The staff is now attempting to ascertain the causes of this shift in preference in order to bolster up the work of the second quarter. A curious drop in correlation occurred during the second quarter this past year. In fact a correlation of only +0.38 was found. In tracing out the factors responsible for this unexpected and exceptionally low correlation we apparently find that it is due to a marked disturbance in student attitude occasioned by an unusual number of changes in instructors from the first to the second quarter. We note 13 cases last year in which performance shifted definitely and markedly simultaneously with a shift in instructors. In those sections where the same instructor carried the student through both quarters these shifts in performance do not occur. If this trend should be confirmed this year we would need to abandon the policy of shifting instructors at the end of the first quarter. This matter is mentioned at length in this place as an illustration of the direct bearing of research findings on administrative policy.

Sectioning of Classes.—For two years an experimental sectioning of students was effected. Two kinds of sections were organized simultaneously; namely, heterogeneous sections which contained all levels of ability and homogeneous sections of either high, medium or low ability. Analysis of the effect of sectioning, while not yet complete, fails to reveal any apparent advantage for such procedure. The correlations between intelligence and achievement for the homogeneous sections are no higher than for the heterogeneous sections (combined of course for purposes of correlation) hence there is no indication that the bright students are motivated to a greater extent by being segregated. The negative character of these results must not lead us to con-

demn the idea of sectioning. We are inclined to believe that techniques for teaching a bright section or a low section have not yet been discovered by the instructors hence the possible advantages of sectioning fail to materialize. At the present time the staff has abandoned the sectioning procedure, chiefly because no one recognizes the low group as a teaching opportunity and no one strongly argues for the privilege of teaching a bright section.

Effect of Size of Classes.—The results on this point have not been analyzed thoroughly as yet. Our first impression is that the instruction is as effective in sections of 45 or 50 as it is in sections of 25 or 30. Further analysis and further experimentation will be needed to confirm this impression.

Student Opinions.—From the start the staff has desired to obtain the students' frank reactions to the course. Only some of the more interesting of these reactions will be reported here.

1. From 90 to 97 per cent of these students would recommend the course to a brother or sister who might be coming to the university.

2. As stated before, the trend of opinion definitely favors the work of the first quarter. Roughly speaking the large majority favor the natural science material as against the social science material.

3. Reactions toward each of the ten sections of the course were obtained. The students consistently claim greater interest in psychology, cultural expression and the fine arts, biology and eugenics, astronomy and social origins. They seem to be least interested in the economic order, the political order, historical and structural geology, and geography. There is reason to believe that these preferences are dependent upon the suitability for survey purposes of the readings and assignments covering the different fields of inquiry. Departure from traditional orthodox text material seems necessary if the interest of the students is to be elicited and maintained. Analysis shows that these interest preferences are determined by the materials available rather than by the interests and specialties of the particular instructors. There

is a very low correlation between the interests these students claim and the effort they believe they put forth in coping with the ten fields of study. Here are additional data at variance with the doctrine of formal discipline. In other words, these students are not interested in a field because it is easy. Neither do they lack interest in a field because it is difficult. If we accept these attitudes at face value then it would seem that efforts to select interesting study assignments need not result in any lessening of effort on the part of students.

4. From two-thirds to three-fourths of the students indicate that the orientation course has influenced or will influence them in the choice of college subjects. Here is positive evidence of an educational guidance function being performed by the course. In specifying instances of influence we note that such subjects as Sociology, Psychology, Economics, Astronomy, Animal Biology, and Geology head the list. It would seem that a frequent objection to survey courses on the ground that such courses are so superficial as to kill a student's desire for deeper knowledge is largely unfounded.

5. From two-thirds to three-fourths of the students state that their instructors encouraged them to think for themselves. This is another encouraging evidence that the course is not functioning as a mere fact dispensing machine.

6. The great majority react favorably toward the personalities of their instructors regarding them as being very patient, inspiring, fair and considerate in their dealings with the students and as being just in grading and marking.

In conclusion permit me to stress the importance of conducting such research work not only for an experimental course such as Orientation but for as many courses as time and funds will permit. In my judgment such research if extended to other courses would in time enable us to place the administration of our collegiate curriculum on a basis of ascertainable fact rather than on the usual basis of belief, opinion, and judgment based on impressions gained from experience.

DONALD G. PATERSON.

A Vocational Interest Test

APPARENTLY the only way to be sure that a vocational guidance test can be relied upon is to try it out on young people and then wait twenty to thirty years to check up the test scores with the careers of these people. Even then there will be some complications. For example, suppose the test indicated that Mr. A. should be a lawyer, but he became a successful physician, we should not know whether he might not have been a successful lawyer if he had entered that profession.

Obviously a procedure requiring twenty to thirty years of time cannot be employed during the exploratory period when one is endeavoring to find a test for guidance purposes. What is a feasible program? Given a test that looks promising, how may it be tested out in order to determine its value?

First, a test should differentiate the men in a given occupation from men in other occupations.[1] This requirement is readily met. All that is necessary is to select men from a number of occupations who are so clearly successful in them that they would be so rated by any standard, and try the test out on them. If it separates men in the given occupation from those in the other occupations, the test fulfills this condition.

Second, the test should differentiate the successful men in the given occupations from the failures, or near-failures. Obviously, a vocational test that is responsible for some men entering an occupation only to fail in it lacks value to that extent. A high correlation between test results and degrees of success is desirable, of course, but not necessary. To

[1]It is conceivable that an efficient guidance test might select those who should enter a given occupation and yet not differentiate men already in the occupation from those not in it. But the writer cannot see how such a test could be standardized without waiting long periods of time.

insist upon such correlation at the present time is to increase tremendously the difficulty of developing a vocational guidance test. For there are no definite standards as to what constitutes success, and when such standards are set up it will be a difficult task to measure them. For example, how reduce to figures the success of one hundred ministers, lawyers or physicians? Ratings of so-called "competent" judges are so inaccurate that their use is probably doing more harm than good in this field. The minimum requirement is that the test designate those who are clearly successful from those who are actual failures.

Third, the test should have high reliability; that is, any individual, when he takes the test the second time, should obtain approximately the same score which he received the first time.

Fourth, the test scores must not be influenced by technical training and practical experience in an occupation. If they are, to just that extent the test is merely a trade test and not a guidance test. One way of meeting this requirement is to try the test out on young men entering the given occupation and also on young men entering other occupations and note if the test separates the former from the latter *fairly well*. The test should not separate these beginners as well as it does older men, because some of the beginners are undoubtedly entering the wrong profession and will leave sooner or later. As pointed out at the beginning of the paper, the final test is to follow the individual careers of thousands of men. But data from cross-sections of men in various stages of learning an occupation may be accepted provisionally.

The Vocational Interest Test meets these requirements, so far as our data go.

The test blank consists of 263 items appearing in this form:

Actor.....	L	I	D
Architect.....	L	I	D
Army Officer.....	L	I	D
Artist.....	L	I	D
Athletic Director.....	L	I	D

The subject records his attitude toward each item by circling L if he would like to do that type of work, by circling I if he is indifferent to it and by circling D if he would dislike it. In addition to items having reference to occupations, there is a list of school subjects (art, botany, chemistry, civics, etc.), a list of peculiarities of people (witty people, educated people, side-show freaks, nervous people, etc.), a list of games (golf, fishing, etc.), a list of activities (working alone, making a speech before a crowd, organizing a play, etc.), and other lists of magazines, kinds of movies, etc. The blank is really a battery of 263 tests, for in each case the data are handled without reference to the other items until a summary of all is made; moveover, it is quite likely that with each item we obtain a measure of a different combination of elementary interests.

The scoring method may be illustrated as follows: 38 per cent of "men in general" (using the average of our seventeen occupational groups for this purpose—admittedly a far from accurate measure) would like to be actors, whereas 14 per cent of engineers, 38 per cent of life insurance salesmen and 53 per cent of ministers would like to be actors. The difference between "men in general" and these three groups are —24 per cent, 0 per cent and +15 per cent. The percentage differences are replaced by the smaller numbers —6, 0 and +3.[2] If now Mr. A indicates that he would like to be an actor, he receives a score of —6 toward being an engineer, a score of 0 toward being a life insurance salesman and +3 toward being a minister. The summary of 263 such scores gives his final score. It is necessary to check up the entire 263 items for each occupational rating. This requires about twelve minutes for one occupational rating, or three hours for fifteen ratings.

The usual procedure in scoring studies of this sort has been to correlate the record of an individual with a group average.

[2]The scoring method is given in detail by K. M. Cowdery, "Measurement of Professional Attitudes," Journal of Personnel Research, August, 1926, and by the writer, "An Interest Test for Personnel Managers," *ibid.*, September and October, 1926.

This procedure gives us very negligible returns. On this basis occupational groups are not separated to any particular degree. The assumption in our procedure is that the gross strength of any interest is not significant in vocational selection. The important factor is whether a man has an interest which distinguishes the occupation from other occupations.

After considerable experimentation, a rating scheme was hit upon that is very satisfactory. A rating of A means a man has the interest of a particular occupational group; a rating of C means he does not have such interests; and a rating of B is intermediate. (Statistically, scores above −1 P. E. are rated A; scores between −1 P. E. and the lowest score recorded by anyone belonging to the group are rated B; and scores below this last figure are rated C.) On this basis:

	Per cent rated A	*B*	*C*
Personnel men in personnel interest.....	3.5	24.8	71.7
592 non-personnel men in personnel interest	75.0	25.0	0
Bankers in personnel interest.....	0	12.0	88.0
Artists in personnel interest.....	0	0	100

There are two real advantages to this rating scheme. First, it is easily understood by the layman who takes the test. Second, it gives high reliability to the A and C ratings which come to mean "Yes" and "No," and it throws the doubtful cases into the B rating which is defined as intermediate. Instead of using a critical score to divide the Yes and No ratings, we use a broad band and make this band broad enough to cover the doubtful cases. With this procedure, practical use may be made of a test before it is well standardized and as it is improved, the per cent of doubtful B ratings will be decreased and the positive A and C ratings increased.

How well does this Vocational Interest Test meet the requirements that are given above?

The test differentiates not only one given occupation from all others but apparently will differentiate any occupation from any other. It has been tried out on sixteen occupations so far and in each case has differentiated men according

to their occupational group. Apparently men engaged in the same profession have a characteristic set of likes and dislikes which distinguish them from men in other professions.

Typical results are given in the following table. The first row reads: 6 per cent of personnel men are rated A in engineering interest, 33 per cent are rated B; 6 per cent are rated A in C. P. A. interest, 13 per cent rated B; 26 per cent are rated A in lawyer interest, 31 per cent rated B; 0 per cent rated A in minister interest, 10 per cent rated B; etc.

	Personnel		*Engineer*		*C.P.A.*		*Lawyer*		*Minister*		*Life Ins. Salesman*		*Artist*	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B
Personnel	–	–	6	33	6	13	26	31	0	10	13	40	0	4
Engineer	2	33	–	–	2	21	0	14	2	5	0	26	2	7
C. P. A.	2	33	2	29	–	–	6	20	0	10	10	53	0	4
Lawyer	2	43	5	25	5	23	–	–	8	10	23	43	0	5
Minister	0	36	0	10	0	0	6	17	–	–	6	28	0	12
LifeIns.Salesman	2	34	0	29	4	12	10	18	4	8	–	–	0	0
Artist	0	0	4	29	0	0	2	9	0	14	0	21	–	–

The above figures amply substantiate the conclusion that occupational groups may be distinguished on the basis of their likes and dislikes. In some cases there is no overlapping at all, in the majority of cases there is considerable overlapping between the fourth quarter of one group and the upper quarter of a second group. It is hoped that the revised blank now being tried out will cut down this overlapping considerably. But we are certain that all of this overlapping cannot be charged against inefficiency in the test procedure. Some of the men who score high in occupations other than their own are undoubtedly qualified to perform such type of work. We have checked up on a considerable number of these cases and found ample evidence of this.

The test differentiates the more successful from the less successful in the two cases where data have been obtained on this point. Thirty-six men from an advertising agency (not included in our criterion group), were scored for advertising interest with the result that 17 rated A, 16 rated B and 3 rated C. All thirty-six were rated as to success in their work by three members of the advertising agency using

2 to mean "Yes," 1 to mean "Not sure" and 0 to mean "No." The results were:

Rated 2.0 by 3 judges.	73% rated A on test, 27% rated B, 0% rated C.
Rated 1.7 by 3 judges.	71% rated A on test, 29% rated B, 0% rated C.
Rated 1.3 by 3 judges.	50% rated A on test, 50% rated B, 0% rated C.
Rated 1.0 by 3 judges.	27% rated A on test, 73% rated B, 0% rated C.
Rated 0.7 by 3 judges.	0% rated A on test, 67% rated B, 33% rated C.
Rated 0.3 by 3 judges.	0% rated A on test, 0% rated B, 100% rated C.

Too much reliance must not be put upon such data for the combined ratings of three judges are not always reliable.

Better evidence that the test indicates who are more successful and who are less successful is shown by data from life insurance salesmen. Records of their "paid-for insurance" have been obtained to date from fifty-five of these men. All of the managers of agencies and their assistants rate A in the test. Because in many cases they do not make any effort to sell, but confine their efforts to helping their men, their records have been eliminated. This gives us production records from thirty-eight men who rate A in the test and from twelve men who rate B in the test, as follows:

	Rated A	*Rated B*
Below $100,000 a year.....	26%	46%
$100,000 to $199,999.....	29	46
$200,000 to $299,999.....	21	8
$300,000 to $899,999.....	24	0

Such results may be a "flash in the pan." Frankly, the writer had not expected the test would separate superior salesmen from inferior ones as well as this.

Cowdery correlated the odd numbered items of the test against the even numbered and reports reliability coefficients for the test between 0.78 and 0.91, depending upon the occupational group. The original blank has been revised and to date records of 31 ministers have been tabulated who have scored both blanks with an interval of nearly two years intervening. A correlation of 0.73 is obtained from this small group using only the 176 items that are common to both blanks. This is an unusually severe test of reliability involving a long interval of time, considering only two-thirds of the items and using two quite different

blanks. In addition, these records range only between +3 P. E. and −3 P. E. whereas the entire scale of minister interest is between +3 P. E. and −9 P. E.

The data so far presented only establish the fact that this interest test is a satisfactory trade test which measures efficiency and separates men according to their occupations. But is it a guidance test? When given to men prior to entering an occupation, will it foretell their success or failure? If the occupational interests measured by the test are a result of professional training and experience, then these interests cannot be used in vocational guidance. But is this the case?

This question has not been thoroughly answered. But Cowdery has found that the four groups, (*a*) freshmen and sophomores planning to be engineers, (*b*) juniors and seniors in engineering school, (*c*) engineers in graduate work, and (*d*) engineers with more than five years' practical experience —all score approximately the same on the vocational interest test. The same holds true in the case of medical students and physicians, and of law students and lawyers. "This fact," writes Cowdery, "is established for groups; whether true for individuals remains to be investigated in later research." This result being accepted, we may conclude that what is measured by an interest test is present in men prior to technical training and practical experience. It is not a resultant of vocational choice, but is one factor, at least, in causing that vocational choice.

A considerable number of Stanford students have been rated by the interest test. In many cases the ratings appear correct, that is, they have agreed with our best judgment. But in other cases there has been no way to check the results. Apparently, so far, there has not occurred a single incorrect rating of C, but possibly there have been some incorrect A ratings. At least in some cases students have not warmed up to the thought of adopting occupations in which the test gave an A rating.

We have interest records for fourteen occupations upon the students in the Graduate School of Business. Anyone

familiar with the confidential details would be struck by several remarkable coincidences. On the other hand, the records do not help at all in several cases, possibly the students' interests lie in occupations other than those tested for. It will be interesting to follow up the careers of these men in the light of our data.

With the revised blank, it is hoped that a larger percentage of A and C ratings may be obtained and a smaller percentage of B ratings, thereby increasing the positiveness of test ratings. With the very small available budget for this work it will take about two years to work out scoring systems for twenty occupations. The statistical work necessary in handling only one hundred cases in each of twenty occupations is very great. If the blank turns out to be as good as is expected, records should then be obtained from a large number of young men in order to determine the relationship between the test ratings and their future careers.

Date.....

Group.....

Key number.....

VOCATIONAL INTEREST BLANK

ADAPTED BY

EDWARD K. STRONG, JR.

STANFORD UNIVERSITY

CALIFORNIA

It is possible with a fair degree of accuracy to determine by this test whether one would like certain occupations or not. The test is not one of intelligence or school work. It measures the extent to which one's interests agree or disagree with those of successful men in a given profession.

Your responses will, of course, be held strictly confidential.

Name..... Age..... Sex.....

Occupation (e.g. Carpenter).....Years of Experience.....

Just what do you do?.....

.....

Name of Firm and Address.....

.....

Address to which correspondence should be sent.....

.....

Highest grade reached in school (e.g. Grammar 6th).....

Did you select your present occupation or was it more or less thrust upon you? Selected it: Yes..... No.....

What occupations, other than your present one, have you at one time or another engaged in?.....

.....

What occupations have you frequently day-dreamed of entering?....

.....

Remarks .....

.....

.....

PART I. *Occupations.*—Indicate after each occupation listed below whether you would like that kind of work or not. Disregard considerations of salary, social standing, future advancement, etc. Consider only whether you would like to do what is involved in the occupation.

Draw a circle around L if you like that kind of work.
Draw a circle around I if you are indifferent to that kind of work.
Draw a circle around D if you dislike that kind of work.

Work rapidly. Your first impressions are desired here. Answer all the items. Many of the seemingly trivial and irrelevant items are very useful in diagnosing your real attitude.

Actor (not movie)	L	I	D	Lawyer, Corporation	L	I	D
Advertiser	L	I	D	Librarian	L	I	D
Architect	L	I	D	Life Insurance Salesman	L	I	D
Army Officer	L	I	D	Locomotive Engineer	L	I	D
Artist	L	I	D	Machinist	L	I	D
Astronomer	L	I	D	Magazine Writer	L	I	D
Athletic Director	L	I	D	Manufacturer	L	I	D
Auctioneer	L	I	D	Marine Engineer	L	I	D
Author of novel	L	I	D	Mechanical Engineer	L	I	D
Author of technical book	L	I	D	Mining Superintendent	L	I	D
Auto Salesman	L	I	D	Musician	L	I	D
Auto Racer	L	I	D	Music Teacher	L	I	D
Auto Repairman	L	I	D	Office Clerk	L	I	D
Aviator	L	I	D	Office Manager	L	I	D
Bank Teller	L	I	D	Orchestra Conductor	L	I	D
Bookkeeper	L	I	D	Pharmacist	L	I	D
Building Contractor	L	I	D	Photo Engraver	L	I	D
Buyer of merchandise	L	I	D	Physician	L	I	D
Carpenter	L	I	D	Playground Director	L	I	D
Cartoonist	L	I	D	Poet	L	I	D
Cashier in bank	L	I	D	Politician	L	I	D
Certified Public Accountant	L	I	D	Printer	L	I	D
Chemist	L	I	D	Private Secretary	L	I	D
Civil Engineer	L	I	D	Railway Conductor	L	I	D
Civil Service Employee	L	I	D	Rancher	L	I	D
Clergyman	L	I	D	Real Estate Salesman	L	I	D
College Professor	L	I	D	Reporter, general	L	I	D
Consul	L	I	D	Reporter, sporting page	L	I	D
Dentist	L	I	D	Retailer	L	I	D
Draftsman	L	I	D	Sales Manager	L	I	D
Editor	L	I	D	School Teacher	L	I	D
Electrical Engineer	L	I	D	Scientific Research Worker	L	I	D
Employment Manager	L	I	D	Sculptor	L	I	D
Explorer	L	I	D	Secretary, Chamber of Commerce	L	I	D
Factory Manager	L	I	D	Secret Service Man	L	I	D
Factory Worker	L	I	D	Ship Officer	L	I	D
Farmer	L	I	D	Shop Foreman	L	I	D
Floorwalker	L	I	D	Social Worker	L	I	D
Florist	L	I	D	Specialty Salesman	L	I	D
Foreign Correspondent	L	I	D	Statistician	L	I	D
Governor of a State	L	I	D	Stock Broker	L	I	D
Hotel Keeper or Manager	L	I	D	Surgeon	L	I	D
Interior Decorator	L	I	D	Toolmaker	L	I	D
Interpreter	L	I	D	Traveling Salesman	L	I	D
Inventor	L	I	D	Typist	L	I	D
Jeweler	L	I	D	Undertaker	L	I	D
Judge	L	I	D	Watchmaker	L	I	D
Labor Arbitrator	L	I	D	Wholesaler	L	I	D
Laboratory Technician	L	I	D	Worker in Y. M. C. A., K. of C., etc	L	I	D
Landscape Gardener	L	I	D				
Lawyer, Criminal	L	I	D				

PART II. *Amusements.*—Indicate in the same manner as in Part I whether you like the following or not. If in doubt, consider your most frequent attitude. *Work rapidly.* Do not think over various possibilities. Record your first impression.

Golf	L	I	D	Auctions	L	I	D
Fishing	L	I	D	Fortune tellers	L	I	D
Hunting	L	I	D	Animal zoos	L	I	D
Tennis	L	I	D	Art galleries	L	I	D
Driving an automobile	L	I	D	Museums	L	I	D
Taking long walks	L	I	D	Vaudeville	L	I	D
Boxing	L	I	D	Musical comedy	L	I	D
Checkers	L	I	D	Symphony concerts	L	I	D
Chess	L	I	D	Pet canaries	L	I	D
Poker	L	I	D	Pet monkeys	L	I	D
Bridge	L	I	D	Snakes	L	I	D
Solitaire	L	I	D	Sporting pages	L	I	D
Billiards	L	I	D	Poetry	L	I	D
Observing birds (nature study)	L	I	D	Detective stories	L	I	D
Solving mechanical puzzles	L	I	D	"Literary Digest"	L	I	D
Playing a musical instrument	L	I	D	"Life"	L	I	D
Performing sleight-of-hand tricks	L	I	D	"New Republic"	L	I	D
Collecting postage stamps	L	I	D	"System"	L	I	D
Drilling in a company	L	I	D	"National Geographic Magazine"	L	I	D
Chopping wood	L	I	D	"American Magazine"	L	I	D
Amusement parks	L	I	D	"Popular Mechanics"	L	I	D
Picnics	L	I	D	"Atlantic Monthly"	L	I	D
Excursions	L	I	D	"Arts and Crafts"	L	I	D
Smokers	L	I	D	Cowboy movies	L	I	D
"Rough house" initiations	L	I	D	Educational movies	L	I	D
Conventions	L	I	D	Travel movies	L	I	D
Full-dress affairs	L	I	D	Social problem movies	L	I	D

PART III. *School Subjects.*—Indicate as in Part II your interest when in school.

Algebra	L	I	D	Mathematics	L	I	D
Agriculture	L	I	D	Manual Training	L	I	D
Arithmetic	L	I	D	Mechanical Drawing	L	I	D
Art	L	I	D	Military Drill	L	I	D
Bible Study	L	I	D	Music	L	I	D
Bookkeeping	L	I	D	Nature Study	L	I	D
Botany	L	I	D	Penmanship	L	I	D
Calculus	L	I	D	Philosophy	L	I	D
Chemistry	L	I	D	Physical Training	L	I	D
Civics	L	I	D	Physics	L	I	D
Dramatics	L	I	D	Psychology	L	I	D
Economics	L	I	D	Physiology	L	I	D
English Composition	L	I	D	Public Speaking	L	I	D
Geography	L	I	D	Shop Work	L	I	D
Geology	L	I	D	Shorthand	L	I	D
Geometry	L	I	D	Sociology	L	I	D
History	L	I	D	Spelling	L	I	D
Languages, ancient	L	I	D	Typewriting	L	I	D
Languages, modern	L	I	D	Zoölogy	L	I	D
Literature	L	I	D				

PART IV. *Activities.*—Indicate your interests as in Part II. *Work rapidly.*

Repairing a clock	L	I	D	Writing personal letters	L	I	D
Making a radio set	L	I	D	Writing reports	L	I	D
Adjusting a carburetor	L	I	D	Entertaining others	L	I	D
Repairing electrical wiring	L	I	D	Bargaining ("swapping")	L	I	D
Cabinetmaking	L	I	D	Looking at shop windows	L	I	D
Operating machinery	L	I	D	Buying merchandise for a store	L	I	D
Handling horses	L	I	D	Displaying merchandise in a store	L	I	D
Giving "first aid" assistance	L	I	D	Expressing judgments publicly regardless of criticism	L	I	D
Raising flowers and vegetables	L	I	D	Being pitted against another as in a political or athletic race	L	I	D
Decorating a room with flowers	L	I	D	Being left to yourself	L	I	D
Arguments	L	I	D	Methodical work	L	I	D
Interviewing men for a job	L	I	D	Regular hours for work	L	I	D
Interviewing prospects in selling	L	I	D	Continually changing activities	L	I	D
Interviewing clients	L	I	D	Continuing at same work until finished	L	I	D
Making a speech	L	I	D	Studying latest hobby, e.g., Einstein theory, Freud, etc.	L	I	D
Organizing a play	L	I	D	Developing business systems	L	I	D
Opening a conversation with a stranger	L	I	D	Saving money	L	I	D
Teaching children	L	I	D	Contributing to charities	L	I	D
Teaching adults	L	I	D	Raising money for a charity	L	I	D
Calling friends by nicknames	L	I	D	Living in the city	L	I	D
Being called by a nickname	L	I	D	Climbing along edge of precipice	L	I	D
Meeting and directing people	L	I	D	Looking at a collection of rare laces	L	I	D
Taking responsibility	L	I	D	Looking at a collection of antique furniture	L	I	D
Meeting new situations	L	I	D				
Adjusting difficulties of others	L	I	D				
Drilling soldiers	L	I	D				
Pursuing bandits in sheriff's posse	L	I	D				
Doing research work	L	I	D				
Acting as yell-leader	L	I	D				

PART V. *Peculiarities of People.*—Record your first impression. Do not think of various possibilities or of exceptional cases. "Let yourself go" and record the feeling that comes to mind as you read the item.

Progressive people	L	I	D	Very old people	L	I	D
Conservative people	L	I	D	Cripples	L	I	D
Energetic people	L	I	D	Side-show freaks	L	I	D
Absent-minded people	L	I	D	People with gold teeth	L	I	D
People who borrow things	L	I	D	People with protruding jaws	L	I	D
Quick-tempered people	L	I	D	People with hooked noses	L	I	D
Optimists	L	I	D	Blind people	L	I	D
Pessimists	L	I	D	Deaf mutes	L	I	D
People who are natural leaders	L	I	D	Self-conscious people	L	I	D
People who assume leadership	L	I	D	People who always agree with you	L	I	D
People easily led	L	I	D	People who talk very loudly	L	I	D
People who have made fortunes in business	L	I	D	People who talk very slowly	L	I	D
Emotional people	L	I	D	People who talk about themselves	L	I	D
Thrifty people	L	I	D	Methodical people	L	I	D
Spendthrifts	L	I	D	Fashionably dressed people	L	I	D
Talkative people	L	I	D	Carelessly dressed people	L	I	D
Religious people	L	I	D	People who do not believe in evolution	L	I	D
Irreligious people	L	I	D	Socialists	L	I	D
People who have done you favors	L	I	D	Bolshevists	L	I	D
People who get rattled easily	L	I	D	Independents in politics	L	I	D
Gruff men	L	I	D	Teetotalers	L	I	D
Witty people	L	I	D	Men who chew tobacco	L	I	D
Foreigners	L	I	D	Women cleverer than you are	L	I	D
Negroes	L	I	D	Men who use perfume	L	I	D
Cautious people	L	I	D	People who chew gum	L	I	D
Sick people	L	I	D	Athletic men	L	I	D
Nervous people	L	I	D				

PART VI. ***Order of Preference of Activities.***—**Indicate which three of the following ten activities you would enjoy most by checking opposite them in column one; also indicate which three you would enjoy least by checking opposite them in column two. Be sure to mark 3 in each column.**

First 3 choices	*Last 3 choices*	
( )	( )	Develop the theory of operation of a new machine, e. g., auto
( )	( )	Operate (manipulate) the new machine
( )	( )	Discover an improvement in the design of the machine
( )	( )	Determine the cost of operation of the machine
( )	( )	Supervise the manufacture of the machine
( )	( )	Create a new artistic effect, i. e., improve the beauty of the auto
( )	( )	Sell the machine
( )	( )	Prepare the advertising for the machine
( )	( )	Teach others the use of the machine
( )	( )	Interest the public in the machine through public addresses

Indicate in the same way what you consider are the three most important factors affecting your work; also the three least important factors. Be sure to mark 3 in each column.

Most important 3 factors	*Least important 3 factors*	
( )	( )	Salary received for work
( )	( )	Steadiness and permanence of work
( )	( )	Opportunity for promotion
( )	( )	Courteous treatment from superiors
( )	( )	Opportunity to make use of all of one's knowledge and experience
( )	( )	Opportunity to ask questions and to consult about difficulties
( )	( )	Opportunity to understand just how one's superior expects work to be done.
( )	( )	Certainty one's work will be judged by fair standards
( )	( )	Freedom in working out one's own methods of doing the work
( )	( )	Co-workers—congenial, competent, and adequate in number

Indicate in the same way the three men you would most like to have been; also the three you would least like to have been.

First 3 choices	*Last 3 choices*	
( )	( )	Luther Burbank "plant wizard"
( )	( )	Enrico Caruso, singer
( )	( )	Thomas A. Edison, inventor
( )	( )	Henry Ford, manufacturer
( )	( )	Charles Dana Gibson, artist
( )	( )	J. P. Morgan, financier
( )	( )	J. J. Pershing, soldier
( )	( )	William H. Taft, jurist
( )	( )	Booth Tarkington, author
( )	( )	John Wanamaker, merchant

Indicate in the same way the three positions you would most prefer to hold in club or society; also the three you least prefer to hold.

First 3 choices	*Last 3 choices*	
( )	( )	President of a Society
( )	( )	Secretary of a Society
( )	( )	Treasurer of a Society
( )	( )	Member of a Society
( )	( )	Chairman, Arrangement Committee
( )	( )	Chairman, Educational Committee
( )	( )	Chairman, Entertainment Committee
( )	( )	Chairman, Membership Committee
( )	( )	Chairman, Program Committee
( )	( )	Chairman, Publicity Committee

PART VII. *Comparison of Interest between Two Items.*—Indicate your choice of the following pairs by checking in the first space if you prefer the item to the left, in the second space if you like both equally well, and in the third space if you prefer the item to the right. Assume other things are equal except the two items to be compared.

Work rapidly.

Street-car motorman	( )	( )	( )	Street-car conductor
Policeman	( )	( )	( )	Fireman (fights fire)
Chauffeur	( )	( )	( )	Chef
Head waiter	( )	( )	( )	Lighthouse tender
House to house canvassing	( )	( )	( )	Retail selling
House to house canvassing	( )	( )	( )	Gardening
Repair auto	( )	( )	( )	Drive auto
Develop plans	( )	( )	( )	Execute plans
Do a job yourself	( )	( )	( )	Delegate job to another
Persuade others	( )	( )	( )	Order others
Deal with things	( )	( )	( )	Deal with people
Plan for immediate future	( )	( )	( )	Plan for five years ahead
Activity which produces tangible returns	( )	( )	( )	Activity which is enjoyed for its own sake
Taking a chance	( )	( )	( )	Playing safe
Definite salary	( )	( )	( )	Commission on what is done
Work for yourself	( )	( )	( )	Carry out general program of superior who is respected
Work which interests you with modest income	( )	( )	( )	Work which does not interest you with large income
Work in a large corporation with little chance of becoming president until age of 55	( )	( )	( )	Work for self in small business
Selling article, quoted 10% below competitor	( )	( )	( )	Selling article, quoted 10% above competitor
Small pay, large opportunities to learn during next 5 years	( )	( )	( )	Good pay, little opportunity to learn during next 5 years
Work involving few details	( )	( )	( )	Work involving many details
Outside work	( )	( )	( )	Inside work
Change from place to place	( )	( )	( )	Work in one location
Great variety of work	( )	( )	( )	Similarity in work
Physical activity	( )	( )	( )	Mental activity
Emphasis upon quality of work	( )	( )	( )	Emphasis upon quantity of work
Technical responsibility (head of a department of 25 people engaged in technical, research work)	( )	( )	( )	Supervisory responsibility (head of a department of 300 people engaged in typical business operation)
Present a report in writing	( )	( )	( )	Present a report verbally
Listening to a story	( )	( )	( )	Telling a story
Playing baseball	( )	( )	( )	Watching baseball
Amusement where there is a crowd	( )	( )	( )	Amusement alone or with one or two others
Nights spent at home	( )	( )	( )	Nights away from home
Reading a book	( )	( )	( )	Going to movies
Belonging to many societies	( )	( )	( )	Belonging to few societies
Few intimate friends	( )	( )	( )	Many acquaintances
Many women friends	( )	( )	( )	Few women friends
Fat men	( )	( )	( )	Thin men
Tall men	( )	( )	( )	Short men
Jealous people	( )	( )	( )	Conceited people
Jealous people	( )	( )	( )	Spendthrifts
People who talk very low	( )	( )	( )	People who talk very loudly
People who talk very fast	( )	( )	( )	People who talk very slowly

PART VIII. *Rating of Present Abilities and Characteristics.*—Indicate below what kind of a person you are right now and what you have done. Check in the *first* column ("Yes") if the item really describes you, in the *third* column ("No") if the item does not describe you, and in the *second* column (?) if you are not sure. (Be frank in pointing out your weak points, for selection of a vocation must be made in terms of them as well as your strong points.)

	YES	*?*	*NO*
Usually start activities of my group	( )	( )	( )
Usually drive myself steadily (do not work by fits and starts)	( )	( )	( )
Win friends easily	( )	( )	( )
Usually get other people to do what I want done	( )	( )	( )
Usually liven up the group on a dull day	( )	( )	( )
Am quite sure of myself	( )	( )	( )
Accept just criticism without getting sore	( )	( )	( )
Have mechanical ingenuity (inventiveness)	( )	( )	( )
Have more than my share of novel ideas	( )	( )	( )
Can carry out plans assigned by other people	( )	( )	( )
Can discriminate between more or less important matters	( )	( )	( )
Am inclined to keep silent (reticent) in confidential and semi-confidential affairs	( )	( )	( )
Am always on time with my work	( )	( )	( )
Remember faces, names, and incidents better than the average person	( )	( )	( )
Can correct others without giving offense	( )	( )	( )
Able to meet emergencies quickly and effectively	( )	( )	( )
Get "rattled" easily	( )	( )	( )
Can write a concise, well-organized report	( )	( )	( )
Have good judgment in appraising values	( )	( )	( )
Plan my work in detail	( )	( )	( )
Follow up subordinates effectively	( )	( )	( )
Put drive into the organization	( )	( )	( )
Stimulate the ambition of my associates	( )	( )	( )
Show firmness without being easy	( )	( )	( )
Win confidence and loyalty	( )	( )	( )
Smooth out tangles and disagreements between people	( )	( )	( )
Am approachable	( )	( )	( )
Discuss my ideals with others	( )	( )	( )

Worry considerably about mistakes ( )	Worry very little ( )	Do not worry ( )
Feelings easily hurt ( )	Feelings hurt sometimes ( )	Feelings rarely hurt ( )
Usually ignore feelings of others ( )	Consider them sometimes ( )	Carefully consider them ( )
Loan money to acquaintances ( )	Loan only to certain people ( )	Rarely loan money ( )
Rebel inwardly at orders from another, obey when necessary ( )	Carry out instructions with little or no feeling ( )	Enter into situation and enthusiastically carry out program ( )
When caught in a mistake usually make excuses ( )	Seldom make excuses ( )	Practically never make excuses ( )
Best-liked friends are superior to me in ability ( )	Equal in ability ( )	Inferior in ability ( )
Handle complaints without getting irritated ( )	Become annoyed at times ( )	Lose my temper at times ( )
Borrow frequently (for personal use) ( )	Borrow occasionally ( )	Practically never borrow ( )
Tell jokes well ( )	Seldom tell jokes ( )	Practically never tell jokes ( )
My advice sought by many ( )	Sought by few ( )	Practically never asked ( )
Frequently make wagers ( )	Occasionally make wagers ( )	Never make wagers ( )

EDWARD K. STRONG, JR.

Selection of Freshmen at Northwestern University College Of Liberal Arts

IT IS required of applicants for admission to the freshman class of the College of Liberal Arts of Northwestern University that they present fifteen units of high school work from a secondary school of acceptable standing. These credits must include three units of English, one unit of Algebra, one of Plane Geometry, two of foreign language, and five additional units from a list of subjects including those just mentioned and the social and exact sciences. The three remaining units may be in any subjects commonly taught in high school except applied music and physical education. In addition to the requirements concerning subjects, the applicant, if he is to be admitted without examinations, must be certified to be in the upper half of his graduating class. Practically, this is almost equivalent to saying that he must have an average above the average of his class. A third general requirement which is implied is that the applicant be of good moral character and at least of fairly stable personality.

There are some who do not meet all these requirements who may still be considered as applicants. The first requirement is invariable. No applicant may be admitted who lacks any of the specified high school units. The rejection also of persons of questionable moral character or very unstable personality is, to the extent that our information permits, without exception. Conditions in high school subjects, since the number of years of language for admission has been lowered, are no longer allowed.

But sometimes applicants are admitted who are not reported as ranking in the upper half of the graduating class of an accredited school. Those who do not graduate but have the necessary units of credit, those from the lower half of

the class, and those from unaccredited schools may be admitted after passing entrance examinations. The entrance examinations consist of standardized tests in English, a test in one year of Algebra, an essay examination in two years of the high school language presented for entrance, and a general psychological examination—a mental alertness test.

The method of collecting information concerning applicants is almost entirely through the use of printed forms. The form sent the high school principal asks the usual questions about the school such as the passing mark, the length of the recitation periods, the number of weeks in a school year, etc. It also asks for the record of the student including not only the subjects taken and the grades earned but also the subjects failed, his exact ranking in the class, the number of students in the class, the extent to which the student has been self-supporting, his participation in school activities, and similar data.

The prospective student makes formal application by filling out what is in reality a personal questionnaire. In this form we ask for the names of the schools attended and the years spent at each. Space is provided for information concerning the birthplace, vocation, and education of parents. Concerning himself, he is asked to state what kind of course he hopes to pursue in college, what vocation he plans to enter, the amount of time he may spend in earning money to pay college expenses, the amount of time he will spend in transportation, and so forth.

A form for a physician's statement is included in the application blanks. This is to be filled out by the family physician and sent directly to the university. The questions asked have to do with general health and other items in which our own university medical staff is interested.

Three copies of another blank are sent to the applicant. These he is to have filled out (1) by a high school teacher or principal, (2) by a parent, and (3) by a friend, a graduate of Northwestern, if possible. This form is designed to get information of an unusual kind about a very small percentage of applicants. The questions are very general and the

answers in most cases are of a stereotyped nature. We ask for an estimate of the probable scholastic success of the applicant in college, the ways in which the prospect has demonstrated his seriousness of purpose, any reason why his admission to college should be postponed or denied, what benefit he will probably derive from college training, and what personality traits should be developed, eliminated. or corrected.

It is on the basis of the information obtained by these blanks, and usually by this alone, that we accept the applicant, reject him, or postpone decision until the results of the entrance examinations are available.

The passing mark on the three objectively scored entrance tests is the score which will separate the upper three-fourths from the lower fourth of all the students admitted to the freshman class. These scores have been determined with students of earlier years. The essay examination of two years of language is marked by a professor of foreign language in the college as either passed or failed. Just what constitutes passing in the language test is determined by the person doing the correcting. (Later we expect to use objective tests in language.)

Applicants who pass all four tests, if they are acceptable except for high school ranking, are admitted. Those who do not pass all are subject to rejection. But not even all of these are refused admission. It is with just these cases, doubtful even after examinations, that we have an opportunity to use our tabulated experience of other years. We have collected data on the success of different types of students from the classes of the last five years. Some of this material has been collected and observed for a sufficiently long time to give us some confidence in using the results as a determining criterion in borderline cases. In other cases practices are tentative and subject to modification. The passing mark of the three objective tests—that is, a score sufficiently high to place one in the upper three-fourths of the entering group—was arrived at by examining the relation of college work and the scores of each of the several tests

during previous years. We have yet to see just how effective this requirement is when applied in exactly the form in which it is now used. However, this information will be available for the next group of applicants.

The one bit of information available before the applicant is accepted which is most valuable in indicating probable success in college is his high school record. The standing of those from high school graduating classes of 100 or more is especially valuable in indicating the quality of work which will be done in college. For some representative groups of students from such high school classes, we have obtained as an indication of the relation between high school ranking and college ranking during the first semester coefficients of correlation above 0.70. The rank of students who come from the smaller high schools is not so valuable in predicting success in college. But the standing even of these is somewhat more valuable than the scores on intelligence tests alone. The results of the general intelligence examination are next best in predicting scholastic success in college. But correlations between the scores made no these tests and the quality of college work have always fallen short of 0.60. The high school standing and the intelligence tests combined, however, are much more valuable than either alone. The placement tests in English and Algebra give a positive correlation with general scholarship but add very little to the predictive value of the high school ranking combined with intelligence test scores. These placement tests are really given for other purposes and consequently do not have a large place in the actual selection of students.

We have been interested in comparing the quality of work done in Liberal Arts by students from a number of the neighboring high schools. We find that there are some noticeable differences in the average quality of work done by groups when divided in this way. If additional groupings are made including in one group all who have come from military academies, another group the students from Catholic schools, and still another from the remaining private schools, we find still greater differences. The students who

come to us from the private schools get somewhat lower college grades than do those who come from the large high schools of this area.

The number of high schools which the applicant has attended may indicate something as to his probable success in college. At any rate, it seems that students who have attended three or more high schools do poorer work than other factors would predict.

When students are divided at entrance according to age into three groups, those under seventeen, those seventeen but under twenty, and those of twenty years or over, it is found that the youngest group does on the average the best work. Those of intermediate age do work somewhat inferior, and those who are in the oldest group do, as a whole, the poorest work. Of course, there are all degrees of success in each group, but the averages of the groups have a negative relation with age.

The amount of outside work may be an important cause of failure. Students doing an excessive amount of work fail or, at best, get grades somewhat lower than otherwise would be expected. The amount of work which will almost certainly cause a student's grades to suffer has been found to be between twenty-five and thirty hours a week. Since many of our students do their work for compensation in different parts of the city of Chicago or live 15 or 20 miles from the campus, the amount of time spent at work can hardly be considered without considering the time spent in transportation. Some students even spend one-sixth of their week in going back and forth. Twenty-five hours a week is not an unheard-of amount of commuting. These excessive amounts of time spent in transportation become handicaps in themselves when unaccompanied by outside work for compensation.

Some data have been compiled concerning family background. The factors considered were such as the birthplace of parents (whether native or foreign born), the education of parents, and the education of brothers and sisters. Variations in these factors seemed to have no consistent and

marked relation to the scholastic success of the students. Apparently those who come to this college are not classified as to scholastic ability by such factors as the place of birth of the parents or by their education or by the education of the brothers and sisters.

The above types of information concerning our students influence very decidedly our disposition of those borderline applicants who, subject to examinations, have failed to pass one, two, or even three of the four tests. If such applicants stand relatively high in the lower half or rank high in their class from an unaccredited high school, they are more likely to be accepted. If the applicant passes with a good score in the mental alertness test and has failed one of the placement tests or the language test, he is more likely to be admitted than one who has failed the mental alertness test and passed the others. The mental test has much more predictive value. However, an applicant who has attended three or four schools, especially if he has gone from one school to another while his parents kept their residence in one community, is not likely to be admitted if other factors do not rather definitely predict success. Because we have found some difference in the type of work done here by students from different high schools, we sometimes, when other factors for and against seem to balance one another, show some favor to those who come from a high school which has heretofore sent us a large proportion of good students. Although the amount of outside work and transportation do have a bearing on the success of students, we do not use these factors as a basis for refusing admission, but rather use them as a reason for restricting the number of hours for which the student may register.

Birthplace of parents is scarcely considered in admitting students. We do, however, attempt to learn the ability of the student to use our language if he himself happens to be of foreign birth.

Below the borderline cases are certain classes which we never accept. Those applicants who do not meet the college subject requirements may not be admitted. They may not

even be admitted on probation or on condition that they make up the deficiency. There is a rule which provides for the admission of special students, but this is not interpreted as a means of admitting those who cannot be admitted because of deficiencies. Those students who fail all of their tests and who are also in the lower half of their class are uniformly denied admittance. On a very few occasions, students who fail three tests but do very well on the fourth and who have favorable records otherwise are admitted. But as a general rule a student is rejected if he fails three tests. Although many of those who fail two tests are denied entrance, the admission of applicants who fail only one or two tests depends very much on the other factors which have been discussed.

The general scheme of admitting students who seem to be of good character then makes decision for certain very favorable and other very unfavorable applicants a matter of applying definite rules which have been carefully worked out. But the real problems of selecting new students lie in the task of evaluating the character traits, other than intellectual ability, of all applicants and in differentiating among those of doubtful capacity as college students; in selecting the best of what we have called borderline cases.

E. L. CLARK.

Student Health Program at Dartmouth

THERE is no point at which colleges and universities have a more definite responsibility today than in the matter of safeguarding student health and in adopting preventive and corrective measures for caring for the young men and women within them. There can be no set formula of operation by which this responsibility may be said to be best discharged. Conditions in no two colleges are the same, and resources for carrying on this type of work differ in degree of completeness in every college and university in the land. The college that is so located that it can draw on the facilities of the large city does not have to concern itself with problems of food and water supply, sanitation, hospital and medical services and other measures of protection and prevention to anything like the degree that is essential in the country college. On the other hand, the city college may be faced with very real problems of providing space for recreation and health-giving exercise and of fitting the college schedule into the complex program of many students who are not residents at the institution. The isolation from outside affairs and the freedom of space which the average country college enjoys make these problems much less difficult to solve.

One common denominator present in all colleges and universities is the acknowledged responsibility of providing for the mental and physical health of the student: first, by using all precautions to safeguard against the rise of illnesses and diseases which can be prevented; second, by adopting some plan of physical education and training which will make the students stronger in body; and third, by having available specialists who will be able to care for diseases not only of the body but also of the mind. The purpose of this article is to describe in some detail the manner in which one college

has been trying to discharge this responsibility. The plan outlined is not given as one of proved worth and as one to be followed blindly by other institutions. It is, rather, the story of a succession of experiments, endorsed by scientific knowledge, and utilized with intelligent supervision by Dartmouth College during recent years. It is to be hoped that, as time goes on, progressive changes will be made, solutions will be found for new problems and improved methods will result from advances made in science.

Dartmouth is a liberal arts college for men, located in Hanover, a small New Hampshire town which lies about 150 miles north of Boston. There being no manufacturing interests and no business other than that done by the tradesmen and retailers, the college has always been forced to assume a paternalistic attitude toward the town. Responsibilities which ordinarily would be considered municipal have, by the very nature of things, become responsibilities of the college. Toward the close of the nineteenth century the sanitary conditions in Hanover were deplorable. It was essential that the college take steps to remedy the situation, and in 1893, largely through the efforts and inspiration of Dr. William J. Tucker, at that time president of the college, a complete system of water-works was installed and an adequate sewer system was laid. In 1903 the entire watershed which fed the reservoir was purchased in order to insure the purity of the water supply. Under the direction of Dr. Howard N. Kingsford, medical director and health officer of the college, a system of careful supervision and inspection was instituted in order to safeguard against the outbreak of contagious and infectious disease. All college buildings were given periodical examination, cultures were taken in all classrooms and dormitories, all restaurants and student boarding houses were placed under inspection, and all farms furnishing milk to the town were examined and a rigid standard was set in order to guarantee that high grade milk would be furnished at all times. As time went on the medical director was able to get more and more cooperation from others until today the college janitors, the townspeople, the

farmers, and others who are in a position to help, realize the importance of taking these precautions and are willing to assist to a large degree in making certain that no unwholesome conditions exist. That this work of the medical director has been successful is best testified to by the following facts: there has never been a case of typhoid fever develop in Hanover since 1896; no deaths have occurred from contagious diseases since 1895; and, with the single exception of the outbreak of influenza during 1918, there has been no serious epidemic in the town for an even longer period.

The college is fortunate in having located in the town the Mary Hitchcock Memorial Hospital, erected in 1893 and since that time widely known as one of the finest cottage hospitals in the country. The hospital is under the management of physicians and surgeons who are connected with the Dartmouth Medical School, and students entering the hospital are placed under the care of the hospital staff. In order to make certain that all students who are ill are receiving proper medical care, the janitors in the dormitories report all cases of illness to the medical director twice a day. He then investigates and sees to it that the case is taken care of, that a doctor has been called, and that precautions have been taken if the illness is contagious. Owing to the natural disposition of most students to keep going even though they may be ill and in need of medical care, the medical director must be constantly on the watch for cases which need his attention. He is responsible at all times when the health of any student is in question, and in order that he may discharge this responsibility without hindrance his authority is considered as final by all concerned.

In the College Catalogue, under the heading "Physical Education," the following statement of purpose is made: "Dartmouth College has stood for the physical development of the student and for the inculcating of a love of exercise which will be carried through life. This department places physical education on a par with other subjects and does not regard it as merely a training of the body, but as an educational factor that will contribute to the health of both mind

and body." Thirteen members in this department are devoting their entire time toward the complete realization of this purpose. Dr. John Bowler, professor of physical education, gives each man entering the college a complete physical examination and determines whether it is advisable for the individual to take part in the normal recreational and athletic program. If the examination fails to bring out any weaknesses and defects which need special attention, the man is free to compete for one of the organized athletic teams or to take part in recreational athletics. He must do one or the other, and for the remainder of his freshman and sophomore years he must take part in some form of athletics at least three times a week. Just as he will receive expert coaching if he decides to compete for a team, so he will be under competent direction if he elects the less formal recreational work.

If the physical examination shows that the individual needs special treatment in order to overcome some serious physical disorder, he will be placed in a separate section and will be given a course of treatment designed to bring him up to normal health, to remove whatever defects he may have, and to get him in shape so that he may join the recreational group in whichever sport he may elect.

In addition to the two years of recreational athletics that the student must complete satisfactorily, he must also take a one-hour course in Physical Education for one semester and pass a satisfactory examination in the course in order to qualify for a degree. This course is designed to cover knowledge of prevention of disease, gross human anatomy, physiology of muscular exercise, personal hygiene and dietetics.

Although the restrictions governing the work of the department of Physical Education are necessarily severe, in order to assure that every student takes care of his health and gets sufficient exercise, the administration of the department organization has been wisely handled. The feeling of compulsion has been removed, for the most part, and the students enter into the recreational work with enthusiasm.

No less important than the work of the physical director,

although fortunately less widely needed by the students, is the work of the college psychiatrist, Dr. Milton Harrington. For many years the problem has been facing all college officers of how to take care of the mentally unwell. College deans, personnel officers, and members of the teaching staff felt the need of having a specialist available to whom men could be sent who needed advice and help to overcome nervous strains, inhibitions, and complexes. It was recognized at the outset that this was a more delicate problem than that of physical education and training. First of all, it was not certain that students who needed help would take kindly to the suggestion that they consult a specialist. It seemed necessary to make this a purely voluntary proposition, and the search was made for a man who would have both the scientific knowledge and the personal charm to draw these sick boys to him. Such a man was found in Dr. Bancroft, who came to Dartmouth in 1921 and who, by cooperating splendidly with the college officers and the faculty, made his influence so fine and so helpful that at the time of his death in 1924 men were coming to him for consultation about all kinds of problems with which, from campus talk, they thought he could help them.

Since 1924 Dr. Harrington has been carrying on the work in the same fine spirit and in the same quiet and unheralded manner has been reaching a majority of the students who need help. In some instances this need is not great. Often it is just a case of offering advice which will help a man in outlining his program of work so that he can find time to do the many things which are a part of his schedule. At other times it is a question of breaking down the examination bogey and of persuading a man that a certain course in his program is not impossible for him to pass. In some few instances, however, more serious mental disorders are present, and within the past two years Dr. Harrington has been able to detect these cases and to see that they received proper treatment. Had this not been done promptly, serious consequences might have resulted.

Against the many arguments which have been raised in

opposition to the work of the psychiatrist in the college can be placed scores of examples where the psychiatrist at Dartmouth has helped students to make more successful their college careers and perhaps their whole lives. For many he has broken down inhibitions which might have caused them to feel inferior, he has raised many from the depths of despondency to the realms of hope and courage, and has given to them the desire to live more complete and more positive lives.

Testimony from many sources is convincing in appraising the value of this mental hygiene work. Men who have come under the influence of the psychiatrist are loud in their praise of the help which he has given them. Members of the faculty testify frequently to the change which has come over men who have found this help. For the deans who formerly met this type of man and were lost in their attempts to be of help, it has proved a godsend to have a man on the job, ready to give this treatment which they felt was necessary but which they were powerless to supply.

During the past three years the college has been paying particular attention to the students who are underweight, experience having proved that such men have neither the nervous nor the physical reserve to withstand excessive strains, even though they may appear to be in the best of health. Dr. W. R. P. Emerson, of Boston, an expert on problems of nutrition, has for many years been engaged in this study and has worked out a method of treatment which is now in operation at Dartmouth for its third successive year.

The fundamental principle upon which the nutrition work is based is that, for a person of any given height and age, there is an optimum weight of from 5 to 10 per cent above the average weight for such a class. Anybody who is 7 per cent or more below the average for his height and age is not only at a disadvantage because of his inability to bear up under the physical and mental strain of college work and extra-curricular activities, but is also more susceptible to tuberculosis, diabetes, and circulatory disorders than is the

man in the average or optimum group. As this phase of the health program is not widely known, perhaps it may be permissible for me to outline briefly the work of Dr. Emerson's office.

During the spring of the year, when men are applying for admission to college, they are requested to fill out their height, weight, and age on their application blanks. A check is made, and all men who are 10 per cent or more underweight are notified and are given brief instructions as to diet and health habits which will help them to increase their weight before entering in the fall. At the time of matriculation the entire class is weighed and measured and the men who are 7 per cent or more underweight are put into a special class. They are excused from work in recreational activities and enter upon a program which is designed to make them gain. First of all a physical examination is given to locate, if possible, any physical defects which might block progress in gaining weight. These few cases having been taken care of, the work settles down to a question of weekly calls at Dr. Emerson's office, where they are weighed and given instructions for the coming week. In general, this program consists of following a few simple rules such as regular hours for meals and sleep, rest before meals, and lunches before going to bed at night. Response to this treatment is most encouraging. Of the sixty-five freshmen in the course during the first semester of 1926–1927, four were able to reach the average weight for height after the fourteen-week period. Sixty-one of the sixty-five gained on the average of 5.65 pounds each, and only four either failed to gain or lost weight. The men who have not yet reached average will continue on with the course until they do.

In addition to the work with freshmen, Dr. Emerson's office also handles groups of upper classmen, and at the present time a few members of the faculty are taking advantage of this opportunity to improve their health and are regular attendants at the nutrition classes.

Although in general the attempt has been made to regulate the college program so that there will be no force in

operation that in any way endangers the health and welfare of the students, there are some conditions which seem to warrant attention. The strain of prolonged examination periods and elaborate social functions, which take place occasionally during the college year, tax the strength of all who participate, and in time to come regulations may be necessary in order to assure that no undesirable and unwise condition exists. It is the responsibility of all college officers to keep this important question always in the foreground and to consider from time to time whether any progressive action can be taken either to remedy harmful conditions which exist or to institute new preventive measures which will strengthen the work being done.

The medical profession is forever on the watch to seek out new truths and new methods which, if applied, will make the health programs of the colleges more effective. It is the responsibility of the colleges to utilize these findings to the maximum and to recognize the health program as one of primary concern.

ROBERT C. STRONG.

Extra-Curriculum or Extra-Curricular?[1]

THE USE of these expressions has grown to be quite common in educational literature, particularly in connection with the word "activities." The old term, "student activities," has faded away. A recent dean's report has a paragraph headed "Extra-classroom Activities." Under this head he discusses chiefly the extra-school activities of the teacher. The rapidity with which the phrase "extra-curricular activities" has come into vogue is most interesting.

The prefix "extra" has long been used before well-known adjectives to make a new adjective, thus giving us a pair with contrasting meanings. Thus we have "mural" and "extramural," "territorial" and "extraterritorial," "judicial" and "extrajudicial."

In all of these cases there was in existence a well-defined adjective to which the prefix was attached. On the other hand, there never has been in common use such an adjective as "curricular." Most dictionaries ignore the existence of this word. Its meaning, if recognized at all, has been "pertaining to a race track or running course," and it is only in recent dictionaries that the word is recognized as a legitimate adjective related to "curriculum," meaning a course of study. It would seem actually that this use of "curricular" was subsequent to the use of the compound "extra-curricular." When a recent writer in a fugitive article speaks of "curricular progress in the high school," one is disposed to inquire whether that progress is in the curriculum or on the athletic field.

The rapid emergence of the word "extra-curricular" seems to be explained by a feeling that in such compounds

[1]Besides the following comments on terminology from Chancellor Kirkland, the Council has received several others too late for inclusion in this issue of THE EDUCATIONAL RECORD. Further discussion of the terminology problems raised in the January issue will be helpful to the Committee on Standards.—EDITOR.

we must show a definite adjectival ending. We have, therefore, created without necessity a very awkward word "curricular" which we are proceeding to use in very awkward combinations.

On the other hand, the argument for "extra-curriculum" is based on sound and satisfactory reasoning. It is well known that the English language permits nouns in form to be used freely as adjectives without the adoption of any new ending. Nothing is more common than such phrases as "college life," "school problems," "student failures," "faculty changes," "curriculum studies," etc. In many cases the use of the noun as an adjective gives a peculiar meaning which is better understood than would be the similar phrase using a well established adjectival form. Thus "college life" is a clearer phrase than "collegiate life," and "school problems" is better understood than "scholastic problems." In similar manner the college world would easily understand the phrase "curriculum changes," but there never has been a time when it would have accepted the phrase "curricular changes."

The validity of this use of the word "curriculum," which cannot be questioned, is our strongest argument for the word "extracurriculum" as a contrasting adjective. The use of the plural "extracurricula" is merely an indication of the uncertainty with which we have floundered about, trying to make a selection from three words without a clear analysis of the operation. From all that has been said the weight of the argument favors "extra-curriculum." No doubt we shall continue to meet the other expression "extra-curricular," and it may be assumed that there will be a growing tendency to use the adjective "curricular." The feelings of the purist will be hurt in this process, but the development of words and phrases in the English language has generally proceeded without much consideration for the feelings of either grammarians or purists. Nevertheless, it is to be hoped that college catalogs and college literature will maintain a preference for a form that can be strongly defended.

J. H. KIRKLAND.

Accredited Higher Institutions

IN 1924 the American Council on Education approved and published two reports of its Committee on Standards, recommending uniform standards as criteria for accrediting colleges, teacher-training institutions and junior colleges. Since then the various regional associations have worked continuously on this problem, have revised their respective lists each year and are gradually working toward uniform standards. Therefore, the list of accredited higher institutions published by the Council in 1925 is incomplete.

The following list is merely a compilation as of April 1, 1927, of the lists of the established accrediting agencies; namely, the Association of American Universities, the Association of Colleges and Preparatory Schools of the Middle States and Maryland, the Association of Colleges and Secondary Schools of the Southern States, the North Central Association of Colleges and Secondary Schools and the Northwest Association of Secondary and Higher Schools.

It will be noted that the four regional associations of colleges and secondary schools just mentioned cover among them the entire United States with the exception of New England and the far southwest. Hence institutions in those two regions would not appear in the following list unless they appear on the list of the Association of American Universities, which is a national list.

The American Council on Education has printed as a separate pamphlet its recommendations concerning standards for accrediting higher institutions. Copies of this pamphlet and of the accompanying list will be sent without charge on request addressed to the office of the Council.

ALABAMA

Name of Institution	*Location*
Alabama College for Women	Montevallo
Alabama Polytechnic Institute	Auburn
Birmingham-Southern College	Birmingham
Howard College	Birmingham

Name of Institution	*Location*
Judson College	Marion
Springhill College	Springhill
University of Alabama	University
ARIZONA	
University of Arizona	Tucson
ARKANSAS	
Hendrix College	Conway
Ouachita College	Arkadelphia
University of Arkansas	Fayetteville
CALIFORNIA	
California Institute of Technology	Pasadena
Dominican College of San Rafael	San Rafael
Mills College	Oakland
Occidental College	Los Angeles
Pomona College	Claremont
Stanford University	Stanford University
University of California	Berkeley
University of Redlands	Redlands
University of Southern California	Los Angeles
COLORADO	
Colorado Agriculture College	Fort Collins
Colorado College	Colorado Springs
Loretto Heights College	Denver
University of Colorado	Boulder
University of Denver	Denver
CONNECTICUT	
Connecticut College for Women	New London
Trinity College	Hartford
Wesleyan University	Middletown
Yale University	New Haven
DELAWARE	
University of Delaware	Newark
DISTRICT OF COLUMBIA	
Catholic University of America	Washington, D. C.
George Washington University	Washington, D. C.
Georgetown University	Washington, D. C.
Howard University	Washington, D. C.
Trinity College	Washington, D. C.

FLORIDA

Name of Institution	*Location*
Florida State College for Women	Tallahassee
Southern College	Lakeland
University of Florida	Gainesville

GEORGIA

Agnes Scott College	Decatur
Emory University	Oxford
Georgia School of Technology	Atlanta
Georgia State College for Women	Milledgeville
La Grange College	La Grange
Mercer University	Macon
Shorter College for Women	Rome
University of Georgia	Athens
Wesleyan College	Macon

HAWAII

University of Hawaii	Honolulu, T. H.

IDAHO

College of Idaho	Caldwell
University of Idaho	Moscow

ILLINOIS

Armour Institute of Technology	Chicago
Augustana College and Theological Seminary	Rock Island
Bradley Polytechnic Institute	Peoria
Carthage College	Carthage
De Paul University	Chicago
Eureka College	Eureka
Illinois College	Jacksonville
Illinois Wesleyan University	Bloomington
Illinois Woman's College	Jacksonville
James Millikin University	Decatur
Knox College	Galesburg
Lake Forest College	Lake Forest
Lewis Institute	Chicago
Loyola University	Chicago
Monmouth College	Monmouth
North Central College	Naperville
Northwestern University	Evanston
Rockford College	Rockford

Name of Institution	*Location*
Rosary College	River Forest
Shurtleff College	Alton
University of Chicago	Chicago
University of Illinois	Urbana
Wheaton College	Wheaton

INDIANA

Butler University	Indianapolis
De Pauw University	Greencastle
Earlham College	Richmond
Franklin College of Indiana	Franklin
Hanover College	Hanover
Indiana University	Bloomington
Purdue University	Lafayette
Rose Polytechnic Institute	Terre Haute
St. Mary's College	Notre Dame
St. Mary of the Woods College	St. Mary of the Woods
University of Notre Dame du Lac	Notre Dame
Wabash College	Crawfordsville

IOWA

Coe College	Cedar Rapids
Columbia College of Dubuque	Dubuque
Cornell College	Mt. Vernon
Drake University	Des Moines
Grinnell College	Grinnell
Iowa State College of Agriculture and Mechanic Arts	Ames
Iowa Wesleyan College	Mt. Pleasant
Luther College	Decorah
Morningside College	Sioux City
Mt. St. Joseph College	Dubuque
Parsons College	Fairfield
Penn College	Oskaloosa
St. Ambrose College	Davenport
Simpson College	Indianola
University of Dubuque	Dubuque
University of Iowa	Iowa City

KANSAS

Baker University	Baldwin
College of Emporia	Emporia
Kansas State Agricultural College	Manhattan
Municipal Uuniversity of Wichita	Wichita

Name of Institution	*Location*
Ottawa University	Ottawa
St. Benedict's College	Atchison
St. Mary's College	St. Mary's
Southwestern College	Winfield
University of Kansas	Lawrence
Washburn College	Topeka
KENTUCKY	
Berea College	Berea
Centre College of Kentucky	Danville
Georgetown College	Georgetown
Transylvania College	Lexington
University of Kentucky	Lexington
University of Louisville	Louisville
LOUISIANA	
Centenary College of Louisiana	Shreveport
Louisiana College	Pineville
Louisiana State University	Baton Rouge
Newcomb College	New Orleans
Southwestern Louisiana Institute	Lafayette
Tulane University of Louisiana	New Orleans
MAINE	
Bates College	Lewiston
Bowdoin College	Brunswick
Colby College	Waterville
University of Maine	Orono
MARYLAND	
College of Notre Dame of Maryland	Baltimore
Goucher College	Baltimore
Hood College	Frederick
Johns Hopkins University	Baltimore
Morgan College	Baltimore
Mt. St. Mary's College	Emmitsburg
St. John's College	Annapolis
University of Maryland	College Park
Washington College	Chestertown
Western Maryland College	Westminster
MASSACHUSETTS	
Amherst College	Amherst
Boston College	Boston
Boston University	Boston

Name of Institution	*Location*
Clark University	Worcester
Harvard University	Cambridge
Massachusetts Agricultural College	Amherst
Massachusetts Institute of Technology	Cambridge
Mt. Holyoke College	South Hadley
Radcliffe College	Cambridge
Simmons College	Boston
Smith College	Northampton
Tufts College	Tufts College
Wellesley College	Wellesley
Wheaton College	Norton
Williams College	Williamstown
Worcester Polytechnic Institute	Worcester
MICHIGAN	
Albion College	Albion
Alma College	Alma
Battle Creek College	Battle Creek
College of the City of Detroit	Detroit
Hillsdale College of Michigan	Hillsdale
Hope College	Holland
Kalamazoo College	Kalamazoo
Marygrove College	Detroit
Michigan State College of Agriculture and Applied Science	East Lansing
Michigan College of Mines	Houghton
University of Detroit	Detroit
University of Michigan	Ann Arbor
MINNESOTA	
Carleton College	Northfield
College of St. Catherine	St. Paul
College of St. Teresa	Winona
College of St. Thomas	St. Paul
Concordia College	Moorhead
Gustavus Adolphus College	St. Peter
Hamline University	St. Paul
Macalester College	St. Paul
St. Olaf College	Northfield
University of Minnesota	Minneapolis
MISSISSIPPI	
Millsaps College	Jackson
Mississippi Agricultural and Mechanical College	A. and M. College

Name of Institution	*Location*
Mississippi College	Clinton
Mississippi State College for Women	Columbus
Mississippi Woman's College	Hattiesburg
University of Mississippi	University

MISSOURI

Central College	Fayette
Culver-Stockton College	Canton
Drury College	Springfield
Lindenwood College	St. Charles
Missouri Valley College	Marshall
Missouri Wesleyan College	Cameron
Park College	Parkville
St. Louis University	St. Louis
University of Missouri	Columbia
Washington University	St. Louis
Webster College for Women	Webster Groves
Westminster College	Fulton
William Jewell College	Liberty

MONTANA

Montana State College	Bozeman
State University of Montana	Missoula

NEBRASKA

Creighton University	Omaha
Doane College	Crete
Hastings College	Hastings
Nebraska Wesleyan University	Lincoln
University of Nebraska	Lincoln

NEVADA

University of Nevada	Reno

NEW HAMPSHIRE

Dartmouth College	Hanover
University of New Hampshire	Durham

NEW JERSEY

College of St. Elizabeth	Convent Station
Georgian Court College	Lakewood
Princeton University	Princeton
Rutgers University	New Brunswick
Stevens Institute of Technology	Hoboken

NEW MEXICO

Name of Institution	*Location*
New Mexico College of Agriculture and Mechanic Arts	State College
State University of New Mexico	Albuquerque

NEW YORK

Adelphi College of Brooklyn	Brooklyn
Alfred University	Alfred
Barnard College	New York City
Canisius College of Buffalo	Buffalo
Clarkson School of Technology	Potsdam
Colgate University	Hamilton
College of the City of New York	New York City
College of Mt. St. Vincent on the Hudson	New York City
College of New Rochelle	New Rochelle
College of the Sacred Heart	New York City
Columbia University	New York City
Cornell University	Ithaca
Elmira College	Elmira
Fordham University	Fordham
Hamilton College	Clinton
Hobart College	Geneva
Hunter College of the City of New York	New York City
Manhattan College	New York City
New York University	New York City
Niagara University	Niagara
Polytechnic Institute of Brooklyn	Brooklyn
Rensselaer Polytechnic Institute	Troy
Skidmore College	Saratoga Springs
St. Bonaventure's College and Seminary	St. Bonaventure
St. John's College	Brooklyn
St. Lawrence University	Canton
St. Stephen's College	Annandale
Syracuse University	Syracuse
Union College	Schenectady
United States Military Academy	West Point
University of Buffalo	Buffalo
University of Rochester	Rochester
Vassar College	Poughkeepsie
Wells College	Aurora
William Smith College	Geneva

NORTH CAROLINA

Name of Institution	*Location*
Davidson College	Davidson
Duke University	Durham
Elon College	Elon
Greensboro College	Greensboro
Guilford College	Guilford College
Meredith College	Raleigh
North Carolina College for Women	Greensboro
Queens College	Charlotte
Salem College	Winston-Salem
University of North Carolina	Chapel Hill
Wake Forest College	Wake Forest

NORTH DAKOTA

Jamestown College	Jamestown
North Dakota Agricultural College	Agricultural College
University of North Dakota	Grand Forks

OHIO

Antioch College	Yellow Springs
Baldwin Wallace College	Berea
Capital University	Columbus
Case School of Applied Science	Cleveland
College of Wooster	Wooster
Denison University	Granville
Heidelberg College	Tiffin
Hiram College	Hiram
John Carroll University	Cleveland
Kenyon College	Gambier
Lake Erie College	Painesville
Marietta College	Marietta
Miami University	Oxford
Mt. Union College	Alliance
Municipal University of Akron	Akron
Muskingum College	New Concord
Oberlin College	Oberlin
Ohio State University	Columbus
Ohio University	Athens
Ohio Wesleyan University	Delaware
Otterbein University	Westerville
St. Xavier College	Cincinnati
University of Cincinnati	Cincinnati
University of the City of Toledo	Toledo

Name of Institution	*Location*
Western College for Women	Oxford
Western Reserve University	Cleveland
Wittenberg College	Springfield
OKLAHOMA	
Oklahoma Agricultural and Mechanical College	Stillwater
Oklahoma College for Women	Chickasha
Phillips University	Enid
University of Oklahoma	Norman
OREGON	
Oregon State Agricultural College	Corvallis
Pacific University	Forest Grove
Reed College	Portland
University of Oregon	Eugene
Willamette University	Salem
PENNSYLVANIA	
Albright College	Myerstown
Allegheny College	Meadville
Bryn Mawr College	Bryn Mawr
Bucknell University	Lewisburg
Carnegie Institute of Technology	Pittsburgh
Dickinson College	Carlisle
Franklin and Marshall College	Lancaster
Geneva College	Beaver Falls
Gettysburg College	Gettysburg
Grove City College	Grove City
Haverford College	Haverford
Juniata College	Huntingdon
Lafayette College	Easton
Lebanon Valley College	Annville
Lehigh University	Bethlehem
Lincoln University	Lincoln University
Marywood College	Scranton
Moravian College and Theological Seminary	Bethlehem
Muhlenberg College	Allentown
Pennsylvania College for Women	Pittsburgh
Pennsylvania State College	State College
St. Joseph College	Philadelphia
St. Vincent College	Beatty
Seton Hill College	Greensburg
Swarthmore College	Swarthmore

Name of Institution	*Location*
Temple University	Philadelphia
Thiel College	Greenville
University of Pennsylvania	Philadelphia
University of Pittsburgh	Pittsburgh
Ursinus College	Collegeville
Villanova College	Villanova
Washington and Jefferson College	Washington
Westminster College	New Wilmington
Wilson College	Chambersburg
RHODE ISLAND	
Brown University	Providence
SOUTH CAROLINA	
Chicora College for Women	Columbia
Coker College	Hartsville
College of Charleston	Charleston
Columbia College	Columbia
Converse College	Spartanburg
Erskine College	Due West
Furman University	Greenville
Lander College	Greenwood
Presbyterian College of South Carolina	Clinton
The Citadel	Charleston
University of South Carolina	Columbia
Winthrop College	Rock Hill
Wofford College	Spartanburg
SOUTH DAKOTA	
Dakota Wesleyan University	Mitchell
Huron College	Huron
South Dakota State College of Agriculture and Mechanic Arts	Brookings
South Dakota State School of Mines	Rapid City
University of South Dakota	Vermillion
Yankton College	Yankton
TENNESSEE	
Maryville College	Maryville
Southwestern	Memphis
Tusculum College	Greenville
University of Chattanooga	Chattanooga
University of the South	Sewanee
University of Tennessee	Knoxville
Vanderbilt University	Nashville

TEXAS

Name of Institution	*Location*
Agricultural and Mechanical College of Texas	College Station
Baylor College for Women	Belton
Baylor University	Waco
College of Industrial Arts	Denton
Incarnate Word College	San Antonio
Our Lady of the Lake College	San Antonio
Rice Institute	Houston
Southwestern University	Georgetown
Southern Methodist University	Dallas
Texas Christian University	Fort Worth
Trinity University	Waxahachie
University of Texas	Austin

UTAH

Brigham Young University	Provo
University of Utah	Salt Lake City
Utah Agricultural College	Logan

VERMONT

Middlebury College	Middlebury
University of Vermont	Burlington

VIRGINIA

Bridgewater College	Bridgewater
College of William and Mary in Virginia	Williamsburg
Emory and Henry College	Emory
Hampden-Sidney College	Hampden-Sidney
Randolph-Macon College for Men	Ashland
Randolph-Macon Woman's College	Lynchburg
Sweet Briar College	Sweet Briar
University of Richmond	Richmond
University of Virginia	Charlottesville
Virginia Military Institute	Lexington
Virginia Polytechnic Institute	Blacksburg
Washington and Lee University	Lexington

WASHINGTON

College of Puget Sound	Tacoma
State College of Washington	Pullman
University of Washington	Seattle
Whitman College	Walla Walla

WEST VIRGINIA

Name of Institution	*Location*
Bethany College	Bethany
West Virginia University	Morgantown
West Virginia Wesleyan College	Buckhannon

WISCONSIN

Beloit College	Beloit
Carroll College	Waukesha
Lawrence College	Appleton
Marquette University	Milwaukee
Milwaukee-Downer College	Milwaukee
St. Mary's College	Prairie du Chien
University of Wisconsin	Madison

WYOMING

University of Wyoming	Laramie

Teachers' Colleges

COLORADO

Colorado State Teachers' College	Greeley
Western State College of Colorado	Gunnison

IDAHO

State Normal School	Albion
State Normal School	Lewiston

ILLINOIS

Illinois State Normal University	Normal
Eastern Illinois State Teachers' College	Charleston
Northern Illinois State Teachers' College	De Kalb
Southern Illinois State Normal Univ.	Carbondale
Western Illinois State Teachers' College	Macomb

INDIANA

Indiana State Normal School	Terre Haute

IOWA

Iowa State Teachers' College	Cedar Falls

KANSAS

Name of Institution	*Location*
Fort Hayes Normal School	Fort Hayes
State Manual Train. Norm. School	Pittsburgh
State Normal School	Emporia

KENTUCKY

Western Kentucky Teachers' College	Bowling Green

LOUISIANA

Louisiana State Normal College	Natchitoches

MICHIGAN

Central Michigan Normal School	Mount Pleasant
Detroit Teachers' College	Detroit
Michigan State Normal College	Ypsilanti
Northern State Normal School	Marquette
Western State Normal School	Kalamazoo

MINNESOTA

State Teachers' College	Moorhead
State Teachers' College	Winona
St. Cloud State Teachers' College	St. Cloud

MISSOURI

Central Mo. State Teachers' College	Warrensburg
Garris Teachers' College	St. Louis
Northwest Mo. State Teachers' Coll.	Maryville
State Teachers' College	Kirksville
Southeast Mo. State Teachers' Coll.	Cape Girardeau
Southwest Mo. State Teachers' Coll.	Springfield
Teachers College	Kansas City

MONTANA

State Normal School	Dillon

NEBRASKA

State Normal School and Teachers' College	Chadron
State Normal School and Teachers' College	Kearney
State Normal School and Teachers' College	Peru
State Normal School and Teachers' College	Wayne

NEW YORK

Name of Institution	*Location*
New York State College for Teachers	Albany

NORTH DAKOTA

State Normal School	Mayville
State Teachers' College	Valley City
Teachers College	Minot

OHIO

Cleveland School of Education	Cleveland
State Normal College	Bowling Green
State Normal College	Kent
State Normal College of Ohio Univ.	Athens
Teachers' College of Miami Univ.	Oxford

OKLAHOMA

Central State Teachers' College	Edmond
East Central State Teachers' College	Ada
Northeastern State Teachers' College	Tahlequah
Northwestern State Teachers' College	Alva
Southeastern State Teachers' College	Durant
Southwestern State Teachers' College	Weatherford

OREGON

State Normal School	Monmouth

SOUTH DAKOTA

Northern Norm. and Indus. School	Aberdeen
State Normal School	Madison

TENNESSEE

George Peabody College for Teachers	Nashville

WASHINGTON

State Normal School	Bellingham
State Normal School	Centralia
State Normal School	Cheney
State Normal School	Ellensburg

WEST VIRGINIA

Marshall College	Huntington, W. Va.
West Virginia Collegiate Institute	Institute, W. Va.

WISCONSIN

Name of Institution	*Location*
State Normal School	Superior

Junior Colleges

ALABAMA

Marion Institute	Marion

ARKANSAS

Central Junior College	Conway

COLORADO

Regis College	Denver

GEORGIA

Junior College of Augusta	Augusta

IDAHO

Idaho Technical Institute	Pocatello

ILLINOIS

Broadview College	La Grange
Crane Junior College	Chicago
Elmhurst College	Elmhurst
Frances Shimer School	Mount Carrol
Joliet Junior College	Joliet
Monticello Seminary	Godfrey
Morton Junior College	Cicero
Y. M. C. A. School of Liberal Arts	Chicago

IOWA

Graceland College	Lamoni
Mason City Junior College	Mason City

MICHIGAN

Bay City Junior College	Bay City
Detroit Junior College	Detroit
Emmanuel Missionary College	Berrien Springs
Grand Rapids Junior College	Grand Rapids
Highland Park Junior College	Highland Park

MINNESOTA

Name of Institution	*Location*
Hibbing Junior College	Hibbing
Rochester Junior College	Rochester
Virginia Junior College	Virginia

MISSISSIPPI

Gulf Park College	Gulfport

MISSOURI

Christian College	Columbia
Junior College of Kansas	Kansas City
Kemper Military School	Boonville
The Principia	St. Louis
St. Joseph Junior College	St. Joseph
Stephens Junior College	Columbia
William Woods College	Fulton

MONTANA

Mt. St. Charles College	Helena

NEBRASKA

Union College	College View

NORTH CAROLINA

Mars Hill College	Mars Hill

OKLAHOMA

Northeastern Oklahoma Junior College	Miami

TENNESSEE

Tennessee Wesleyan College	Athens

TEXAS

John Tarleton Agricultural College	Stephenville

VIRGINIA

Sullins College	Bristol

Psychological Examinations for College Freshmen

COMPLETE returns for the 1926 edition of psychological examination have not yet been received, and it has not even been possible to prepare norms including all the reports which have come in. The norms given in the following tables are for about 5,200 students in 26 colleges. The reports are coming in steadily, and it is intended to publish more complete norms in a later issue of the EDUCATIONAL RECORD. The data covered by the norms given here are extensive enough to be reliable and will afford a valid basis for comparison of scores in one college with a large group of college freshmen.

In addition to these norms for each separate test in the 1926 edition, Table 8 gives the percentile ranks for various gross scores. A single index of a student's performance in the examination is given by the percentile rank of his gross score rather than by a combination of his ranks in the separate tests.

SCORING METHODS

A few points in the methods of scoring the tests should be made clear, although the scoring has been direct and uncomplicated.

No Corrections for Errors.—The score in each test is simply the number of right answers or, in the case of the 1926 edition, the number of right answers multiplied by a constant. No correction is made for wrong answers in any of the tests.

Median Percentile Scores.—School administrators are often interested to know a single score for the whole examination rather than separate scores in all the tests. Since the tests are of unequal length it is not possible to add the raw scores directly, and the use of the median percentile rank as a single score was recommended for the 1924 and for the 1925 editions of the examination.

Profile Charts.—Charts showing the percentile standing of a student in each test and arranged so that similar tests were adjacent to each other were used with the 1924 examination. Such a method was of more value in educational guidance than as a means of obtaining a single rating on a student.

Gross Scores.—All the tests in the 1926 edition have been used in previous examinations and are comparable in difficulty with former tests. The weightings for the separate scores in the 1926 examination are based on the distributions obtained in former tests as follows. The standard deviation was calculated for each distribution. The weighting multipliers are proportional to the reciprocals of the standard deviations (some approximations being used in order to make all the multipliers integral). It is believed that the gross score obtained by multiplying each test score by a given constant and adding the products is a useful one, and a preliminary study has shown it to be practically as diagnostic of school success as a score obtained by the method of partial correlation. If a single rank of the student is desired, the percentile rank of the gross score should be used rather than the median percentile rank.

TABLE 1.—OPPOSITES TEST (1926)

Frequency Table and Percentile Ranks for 5,190 Students in 26 Colleges

Average Score = 21.15

Score	Frequency	Percentile Rank	Score	Frequency	Percentile Rank
0	394	.038	42	125	.913
3	159	.091	45	93	.934
6	310	.136	48	80	.950
9	410	.206	51	62	.964
12	478	.291	54	39	.974
15	458	.382	57	33	.981
18	433	.467	60	26	.987
21	395	.547	63	15	.990
24	389	.622	66	18	.994
27	326	.692	69	7	.996
30	322	.754	72	10	.998
33	250	.809	75	2	.999
36	196	.852	78	1	.999
39	155	.886	81	4	.999

TABLE 2.—PROVERBS TEST (1926)

Frequency Table and Percentile Ranks for 5,194 *Students in* 26 *Colleges*

Average Score = 23.52

Score	Frequency	Percentile Rank	Score	Frequency	Percentile Rank
0	171	.016	32	501	.735
4	258	.058	36	429	.825
8	393	.120	40	297	.895
12	506	.207	44	201	.943
16	501	.304	48	126	.974
20	581	.408	52	44	.991
24	555	.517	56	22	.997
28	604	.629	60	5	.999

TABLE 3.—ARITHMETIC TEST (1926)

Frequency Table and Percentile Ranks for 5,198 *Students in* 26 *Colleges*

Average Score = 28.54

Score	Frequency	Percentile Rank	Score	Frequency	Percentile Rank
0	50	.048	44	256	.852
4	151	.024	48	195	.895
8	250	.062	52	150	.928
12	371	.122	56	110	.953
16	504	.207	60	77	.971
20	514	.305	64	45	.983
24	612	.413	68	32	.991
28	526	.522	72	20	.996
32	532	.624	76	9	.998
36	442	.718	80	4	.999
40	348	.794			

TABLE 4.—ARTIFICIAL LANGUAGE TEST (1926)

Frequency Table and Percentile Ranks for 5,207 Students in 26 Colleges

Average Score = 24.11

Score	Frequency	Percentile Rank	Score	Frequency	Percentile Rank
0	53	.005	38	89	.878
1	19	.012	39	68	.893
2	24	.016	40	57	.905
3	43	.023	41	57	.916
4	46	.031	42	55	.927
5	52	.041	43	54	.937
6	60	.051	44	30	.945
7	56	.062	45	25	.950
8	76	.075	46	24	.955
9	59	.088	47	7	.958
10	71	.101	48	11	.960
11	104	.117	49	16	.962
12	97	.137	50	21	.966
13	108	.156	51	29	.971
14	119	.178	52	24	.976
15	143	.203	53	20	.980
16	230	.239	54	10	.983
17	237	.284	55	7	.985
18	244	.330	56	7	.986
19	211	.374	57	6	.987
20	175	.411	58	7	.988
21	158	.443	59	7	.990
22	154	.473	60	7	.991
23	169	.504	61	6	.992
24	185	.538	62	4	.993
25	182	.573	63	3	.994
26	177	.608	64	5	.995
27	167	.641	65	4	.996
28	152	.671	66	4	.996
29	124	.698	67	2	.997
30	125	.722	68	2	.997
31	104	.744	69	4	.998
32	119	.765	70	1	.998
33	118	.788	71	1	.999
34	106	.809	72	3	.999
35	91	.828	73	2	.999
36	93	.846	74	2	.999
37	75	.862			

TABLE 5.—NUMBER COMPLETION TEST (1926)

Frequency Table and Percentile Ranks for 5,207 Students in 26 Colleges

Average Score = 18.76

Score	Frequency	Percentile Rank	Score	Frequency	Percentile Rank
0	473	.045	26	263	.708
2	157	.106	28	282	.761
4	165	.137	30	249	.812
6	179	.170	32	210	.856
8	217	.208	34	147	.890
10	267	.254	36	159	.919
12	265	.305	38	112	.945
14	315	.361	40	93	.965
16	282	.418	42	65	.980
18	308	.475	44	35	.990
20	348	.538	46	23	.995
22	296	.600	48	13	.999
24	284	.656			

TABLE 6.—COMPLETION TEST (1926)

Frequency Table and Percentile Ranks for 5,203 Students in 26 Colleges

Average Score = 20.41

Score	Frequency	Percentile Rank	Score	Frequency	Percentile Rank
0	20	.002	30	237	.842
2	52	.009	32	196	.884
4	96	.023	34	136	.916
6	179	.049	36	110	.939
8	218	.088	38	75	.957
10	298	.137	40	56	.970
12	363	.201	42	38	.979
14	363	.271	44	34	.986
16	379	.342	46	25	.991
18	456	.422	48	10	.995
20	481	.512	50	12	.997
22	388	.596	52	3	.999
24	370	.668	54	3	.999
26	299	.733	56	4	.999
28	301	.790	58	1	.999

TABLE 7.—ANALOGIES TEST (1926)

Frequency Table and Percentile Ranks for 5,220 Students in 26 Colleges

Average Score = 20.67

Score	Frequency	Percentile Rank	Score	Frequency	Percentile Rank
0	146	.014	21	167	.468
1	34	.031	22	184	.501
2	42	.039	23	202	.538
3	69	.049	24	174	.574
4	62	.062	25	217	.612
5	103	.078	26	186	.650
6	114	.098	27	170	.684
7	105	.119	28	186	.719
8	105	.139	29	187	.754
9	112	.160	30	191	.791
10	94	.180	31	224	.830
11	134	.202	32	239	.875
12	102	.224	33	156	.912
13	116	.245	34	128	.940
14	119	.268	35	77	.959
15	127	.291	36	82	.975
16	134	.316	37	48	.987
17	137	.342	38	31	.995
18	173	.372	39	5	.998
19	163	.404	40	8	.999
20	167	.436			

TABLE 8.—GROSS SCORES ON TEST (1926 EDITION)

Frequency Table and Percentile Ranks for 5,137 Students in 26 Colleges

Average Score = 156.64

Score	Frequency	Percentile Rank	Score	Frequency	Percentile Rank
0–9	0	.....	200–209	243	.782
10–19	8	.001	210–219	213	.827
20–29	18	.003	220–229	169	.864
30– 39	34	.008	230–239	128	.893
40– 49	79	.019	240–249	126	.918
50– 59	100	.037	250–259	85	.938
60– 69	136	.060	260–269	69	.953
70– 79	178	.090	270–279	51	.965
80– 89	229	.130	280–289	46	.974
90– 99	225	.174	290–299	33	.982
100–109	268	.222	300–309	27	.988
110–119	267	.274	310–319	14	.992
120–129	268	.326	320–329	17	.994
130–139	337	.385	330–339	5	.997
140–149	274	.445	340–349	6	.998
150–159	302	.501	350–359	3	.999
160–169	299	.559	360–369	1	.999
170–179	343	.622	370–379	1	.999
180–189	275	.682	380–389	2	.999
190–199	258	.734			

EQUIVALENT SCORES

It is sometimes desirable to compare the performance of one class with the succeeding class. This is occasionally of considerable interest, but, unless the tests are standardized so as to be directly equivalent in their scores, this cannot be done without some approximations. Since it is probably true that the fifty or sixty thousand students who have taken the American Council tests each year are of practically the same average ability, it is a sound procedure to equate the scores of successive tests on the basis of equivalent percentile ranks. This assumes that the tests are used as measures of the same ability. The procedure, of course, should not be used when the inter-test correlation is low because then different functions are being measured.

As an example of the procedure for determining equivalent scores, we may select the two Completion tests, 1924 edition and the 1925 edition. In Table 9 a set of percentile ranks is tabulated in the first column. The corresponding scores in the two Completion tests are listed in the second and third columns. A table of this form can readily be prepared from the tables of norms of performance. Since there were four tests in the 1924 and 1925 editions which measure practically the same function, the tabulation has been made for these

TABLE 9.—COMPLETION TEST

Percentile	Score in 1924 Edition	Score in 1925 Edition	Percentile	Score in 1924 Edition	Score in 1925 Edition
99	32.5	26.8	40	13.3	8.9
95	27.5	22.1	30	11.5	7.4
90	24.7	19.2	20	9.5	5.9
80	21.3	16.0	10	7.0	4.1
70	18.8	13.8	5	5.0	2.8
60	16.8	12.0	1	2.0	1.0
50	15.0	10.4			

four tests. These four tests are Completion, Opposites, Artificial Language, and Arithmetic. Equivalent scores for the two editions may be read directly from Table 10. Similar tables for other comparisons may be prepared in a similar manner.

A good description of the methods of determining corresponding test scores may be found in Otis, "Statistical Method in Educational Measurement," Chapter 10.

TABLE 10.—EQUIVALENT SCORES IN 1924 AND 1925 EDITIONS

Completion		Opposites		Artificial Language		Arithmetic	
1924	1925	1924	1925	1924	1925	1924	1925
32.7	27.0	19.8	22	65.0	57	15.6	18
31.7	26.0	19.0	21	62.7	55	14.2	17
30.6	25.0	18.2	20	60.2	53	13.0	16
29.6	24.0	17.4	19	58.0	51	11.8	15
28.6	23.0	16.6	18	55.5	49	10.8	14
27.5	22.0	15.8	17	53.0	47	9.8	13
26.6	21.0	14.9	16	50.5	45	8.8	12
25.6	20.0	13.9	15	48.2	43	7.8	11
24.6	19.0	13.0	14	44.7	41	6.9	10
23.4	18.0	12.1	13	41.7	39	6.0	9
22.4	17.0	11.2	12	39.5	37	5.2	8
21.4	16.0	10.3	11	37.2	35	4.3	7
20.2	15.0	9.3	10	34.7	33	3.6	6
19.1	14.0	8.4	9	32.5	31	2.8	5
18.0	13.0	7.4	8	30.2	29	2.1	4
16.8	12.0	6.4	7	28.0	27	1.4	3
15.7	11.0	5.5	6	25.7	25	.8	2
14.6	10.0	4.5	5	23.2	23	.2	1
13.4	9.0	3.6	4	21.5	21		
12.2	8.0	2.7	3	19.2	19		
11.0	7.0	1.8	2	16.5	17		
9.7	6.0	.9	1	14.0	15		
8.3	5.0			12.0	13		
6.9	4.0			10.0	11		
5.6	3.0			8.2	9		
3.7	2.0			6.7	7		
2.0	1.0			4.5	5		
				2.2	3		
				0	1		

RELIABILITY OF THE TESTS

A study of the reliability of the test scores was made for the 1925 edition of the test. Two hundred and fifty papers were marked separately for the scores in even-numbered and in odd-numbered questions for each test. Coefficients of reliability were then calculated by means of the Spearman-Brown formula and the following results given in Table 11 obtained. These results show a high reliability.

TABLE 11.—RELIABILITY OF 1926 EDITION

Test Score	*Coefficient of Reliability (Spearman-Brown formula)*
Opposites Test	.828
Proverbs Test	.711
Arithmetic Test	.845
Artificial Language Test	.979
Number Completion Test	.924
Completion Test	.805
Analogies Test	.966
Gross Score	.959

PREDICTIVE VALUE

A more comprehensive study has been made of the predictive value of the 1925 edition. Correlations have been computed for more colleges, and in addition a single score has been calculated for the whole test, making it possible to give a more reliable single figure for the predictive value of the total examination. The method of determining these total scores was explained in the section on "Scoring Methods."

Table 12 shows the correlations calculated for the 1925 edition.

TABLE 12.—THE PREDICTIVE VALUE OF THE 1925 EXAMINATION

Coefficients of Correlation Between Test Scores and Freshman Scholarships

College	Men or Women	Completion	Arithmetic	Artif. Language	Analogies I	Analogies II	No. Completion	Absurdities	Opposites	Weighted Total Score
Allegheny College	M W	....	....	....	....	....	....	....	....	.533
Amherst College	M	....	....	....	.137	.299	.347	....	....	.387
Baker University	M W	....	....	....	....	....	....	....	....	.561
Case School of Applied Science	M	.170	.265	.176	.189	.142	.293	.199	.243	.310
University of Chicago (Liberal Arts)	M	.492	.410	.328	.299	.446	.338	.355	.472	.558
University of Chicago (Liberal Arts)	W	.459	.337	.407	.354	.318	.361	.373	.411	.501
University of Chicago (Liberal Arts)	M W	.444	.319	.377	.329	.381	.312	.368	.444	.519
University of Chicago (Education)	M W	.248	.466	.335	.281	.198	.273	.318	.353	.479
University of Colorado	M W	....	....	....	....	....	....	....	....	.551
Dickinson College	M W	.323	.334	.411	.297	.412	.358	.187	.315	.480
Hobart College	M	....	....	....	....	....	....	....	....	.367
William Smith College	W	....	....	....	....	....	....	....	....	.243
Massachusetts Agr. College	M W	....	....	....	....	....	....	....	....	.413
Mt. Holyoke College	W	.388	.310	.264	.248	.100	.220	.231	.405	.445
H. Sophie Newcomb College	W	....	....	....	....	....	....	....	....	.247
University of New Hampshire (Liberal Arts)	M W	....	....	....	....	....	....	....	....	.303
University of New Hampshire (Tech.)	M	....	....	....	....	....	....	....	....	.296
Pomona College	M	.525	.417	.361	.388	.411	.220	.294	.472	.572
Pomona College	W	.383	.397	.335	.325	.373	.310	.368	.410	.541
Ripon College	M W	.471	.350	.387	.295	.320	.244	.313	.388	.464
Swarthmore College	M W	.324	.112	.373	.298	.280	.226	.267	.371	.443
Tufts College	M	.341	.376	.304	.254	.106	.052	.269	.331	.458
Wells College	W	....	....	....	....	....	....	....	....	.495
Winona State Teachers College	M W	....	....	....	....	....	....	....	....	.487
Wittenberg College	M	....	....	....	....	....	....	....	....	.532
Wittenberg College	W	....	....	....	....	....	....	....	....	.512
Average Correlations for all schools	....	.372	.341	.338	.284	.291	.274	.295	.385	.452

REPORTS FROM THE COLLEGES

Amherst College, Amherst, Mass.

Prof. C. H. Toll has made a comparative study of the grades earned during the freshman year by the students who were in the highest one-fourth of the class on the basis of several tests and by those students who were in the lowest one-fourth according to test scores. The table below shows the average number of *A* and *B* grades per student and the average number of *E* and *F* grades. There were about forty-five students in each group.

Test	Number of A & B grades		Number of E & F grades	
	High Quarter	Low Quarter	High Quarter	Low Quarter
Otis Test	3.08	1.42	.32	.53
Amherst Test (Completion)	2.83	1.43	.50	.56
Arithmetic (A. C. E.)	2.31	1.46	.50	.69
Artificial Language (A. C. E.)	3.25	1.35	.26	.78
Opposites (A. C. E.)	3.46	1.38	.30	.71
Combined Tests	3.25	1.18	.42	.75

Careful inspection of this table indicates that the best tests in order are the Opposites Test, the Artificial Language Test, the Combined Tests, and the Otis Test. Such a conclusion must be made only with the reservation necessary in such a small number of cases and in the absence of data on a random sample of the group studied.

Antioch College, Yellow Springs, Ohio

Prof. H. B. English reported a Pearson coefficient of correlation of +.39 between average decile rank and average scholarship for a group of upper classmen.

Bucknell University, Lewisburg, Pa.

The following paragraphs are selected from a report submitted by Prof. F. G. Davis on the predictive value of the 1924 examination.

Of students ranking in the lowest quartile of the psychological test 53 per cent ranked in the lowest quarter of college grades, 31 per cent in the third quarter, 14 per cent in second quarter, and only 2 per cent in the first quarter. Thus it appears that 84 per cent who were in the lowest quarter of the test scores were in the lower *half* in college grades.

Students ranking in the third quartile in the tests ranked as follows in college grades: 4th quarter 28 per cent; 3d quarter 26 per cent; 2nd quarter 34 per cent; 1st quarter 12 per cent. Fifty-four per cent of grades made by students ranking in the third quarter of the psychological tests were in the lower half and 46 per cent in the upper half.

Students ranking in the second quarter in the test scores ranked as follows in college grades: 4th quarter 24 per cent; 3d quarter 22 per cent; 2nd quarter 27 per cent; 1st quarter 27 per cent.

Students ranking in the first quarter in the test scores ranked as follows in college grades: 4th quarter 7 per cent; 3d quarter 8 per cent; 2nd quarter 16 per cent; 1st quarter 69 per cent. Thus 85 per cent of students ranking in the highest quarter in psychological test scores ranked in the upper half of their freshman college classes.

The upper quartile in the test scores is 185. Adding 25 to this making 210, and taking all test scores above 210, we find that 87 per cent rank in the highest quarter in their college classes and 13 per cent rank in the second quarter, none of them getting as low as the third quarter. Subtracting a like amount from the lower quartile we learn that 80 per cent rank in the lowest quarter of their class and 20 per cent rank in the third quarter, none rising so high as the first half of the group.

Results at Bucknell lead me to conclude that test results furnish a better basis for grouping or rejection of incoming freshmen than do reports from high schools.

Dropped for Poor Scholarship.—Students dropped for poor scholarship stood as follows on the psychological test: 71 per cent ranked in the lowest fourth; 12 per cent ranked in the third quarter and 17 per cent in the second quarter. This would indicate that the test should be valuable in determining who should not be admitted.

Artificial Language and foreign language taken in college. r equals .48.

Average score in Art. Language	*Average Grade in For. Language*
40	90–98
32.5	80–90
24.1	70–80
22.5	60–70
23	50–60
19.1	0–50

Proverbs and freshman English. r equals .53.

Arithmetic and freshman mathematics. r equals .37.

Grammar and freshman grades in foreign language. r equals .493.

Opposites and freshman English. r equals .261.

Completion test and freshman English. r equals .473.

Case School of Applied Science, Cleveland, Ohio

The following quotation is from a letter by Dean Theo. M. Focke:

I have never written any formal report on your tests, but at the end of the first term I compared the rank on the term's work with the rank

on the median score on your test and found a coefficient of correlation of +.60. We had also used the Army test and found a correlation of +.48.

Dean Focke also sent the following table:

AMERICAN COUNCIL ON EDUCATION TEST STANDING

Scholarship Standing	*1st quarter*	*2nd quarter*	*3rd quarter*	*4th quarter*
1st quarter.....	26	13	6	2
2nd quarter.....	11	16	9	9
3rd quarter.....	5	12	10	14
4th quarter.....	2	6	21	20

Central Michigan Normal School, Mount Pleasant, Mich.

Professors E. C. Rowe and James Vaughn reported that 100 students who had a percentile rank of .25 or below in the tests earned a total of 57.02 honor points, while 100 students who had a percentile rank above .75 earned a total of 228.65 honor points.

Connecticut College, New London, Conn.

Prof. F. E. Morris reports a coefficient of correlation of +.36 between median percentile rank in the nine tests of the 1924 edition and final year standing for 147 freshmen.

Cornell University, Ithaca, N. Y.

Prof. Paul J. Kruse has made a rather intensive analysis of the test results for several groups of students at Cornell University. Since his analysis is rather comprehensive, it is reproduced here in some detail. The table opposite is a summary of his correlations between test scores and average first term scholarship. While first term scholarship is never quite so stable as a full year's average scholarship and while the correlations for one semester are never so high as for a full-year criterion, they are reproduced here with the provision that interpretation of these coefficients should be adjusted in the light of the one semester criterion. It should be noticed that these coefficients represent separate test correlations. The composite or total scores or median percentile scores would probably give coefficients higher than

those for the individual tests. In general, it will be seen that the diagnostic value of tests Analogies I and Number Completion run lower than the coefficients for the other tests. In general, the two tests with the highest diagnostic value are Completion and Arithmetic in the data of Professor Kruse.

The criterion used by Professor Kruse was a weighted scholarship attainment. The numerical equivalent of the letter grade for each course was weighted by the number of hours credit. The average number of points for each student so weighted constituted his criterion. In his correlational analysis, three students with serious language difficulty were excluded. Since he did not work with the entire freshman classes, he selected random samples by including all the students in Agriculture and in Home Economics, the first 150 students, alphabetically, in Arts and Sciences, and in Engineering. Those students who left college during the first semester were not included in his correlational tables because for them there is no available criterion in the form of final grades.

DIAGNOSTIC VALUE OF SIX SEPARATE TESTS (1925 EDITION) AT CORNELL UNIVERSITY

Correlations between Test Scores and Average First Term Scholarship

	Arts and Sciences		Agriculture	Home Economics	Engineering
	Men	Women	Men	Women	Men
(Number of cases)	138	95	149	86	138
Completion	.37	.41	.38	.28	.42
Arithmetic	.44	.43	.32	.17	.44
Artificial Language	.34	.36	.30	.39	.28
Analogies I	.22	.29	.16	.24	.28
Number Completion	.23	.44	.30	.25	.18
Opposites	.34	.40	.29	.24	.31

Dickinson College, Carlisle, Pa.

The first three paragraphs following are quoted from a short article on "Intelligence Tests and Their Use at Dickinson" written by Dean M. G. Filler and published in the *Dickinson Alumnus*.

For two years we have at the invitation of the American Council on Education used a certain standard test with our Freshmen as soon as they have matriculated. We have then compared their college grades with the grades made in this test with results that have been both interesting and helpful.

The following table summarizes these results for last year's Freshman Class:

COMPARISON OF SCORES IN INTELLIGENCE TEST AND GRADES FOR FRESHMAN YEAR

	Average for year					Dropped for poor scholarship	Left college for other reasons
	A	B	C	D	E		
1st Fourth of Class 38 Students..	5	15	10	5	..	.....	3
2nd Fourth of Class 38 Students..	..	9	14	12	..	1	2
3rd Fourth of Class 38 Students..	..	4	13	11	1	9	..
4th Fourth of Class 39 Students..	..	1	12	9	..	15	2
153	5	29	49	37	1	25	7

Thus it will be seen that every one of the five students securing the average of *A* for the work of the Freshman year was placed in the first fourth by the Intelligence Tests, that more than half the twenty-nine *B* students secured place in the first fourth; that all save one of those dropped for poor scholarship came from the lower half.

The scores of 27 students who dropped out of school were compared with the scores of 166 students who remained in school. A weighted score for the eight tests was used. The average score of those students who dropped out was 186.8,

while the average score of those remaining in school was 229.6.

Kalamazoo College, Kalamazoo, Mich.

Prof. E. B. Harper writes, "I obtained a coefficient of correlation of .43 between the first semester grades and the summed percentile ranks on the 8 tests. The letter grades used by the college were reduced to numerical equivalents and the Pearson coefficient calculated."

Marietta College, Marietta, Ohio

Prof. A. C. Watson reports that the correlation between test scores in the 1924 edition and scholarship standing at the end of the first semester was very nearly .70.

Meredith College, Raleigh, N. C.

Dean J. G. Bloomhour has furnished the following results of the 1924 edition of the Psychological Examination.

One hundred and forty students took the test, and a comparison was made of the scholarship records of the highest one-fifth and the lowest one-fifth according to test scores. The scholarship records are for the whole freshman year.

Highest 1/5 *of the class*—28 *students*

21 or 75 per cent pass 30 semester hours of work or more.

27 or 96.4 per cent pass 18 semester hours of work or more.

28 together make 814 semester hours or an average of 29.0 semester hours each.

Lowest 1/5 *of the class*—28 *students*

1 or 5.6 per cent pass 30 semester hours of work or more.

23 or 82.1 per cent did not make 18 semester hours, including those who discontinued before end of session.

16 or 57.1 per cent of those who remained for whole session did not make 18 semester hours.

28 together make 276 semester hours or an average of 9.8 semester hours each.

Michigan State Normal College, Ypsilanti, Mich.

Prof. T. W. H. Irion has given us a statement of the results of the test at the Michigan State Normal College. He used a sample of a few over one hundred cases, a random

sampling of the freshman class, and calculated Pearson coefficients of correlation. He reports three coefficients showing the predictive value of the test. Each represents the correlation between intelligence test scores and scholarship.

Intelligence test scores and academic scholarship ratings	.58
Intelligence test scores and professional scholarship ratings	.48
Intelligence test scores and combined scholarship ratings	.52

University of Missouri, Columbia, Mo.

The following quotations are taken from the Phi Delta Kappa Bulletin for April, 1926. The statements are a very brief summary of the results of two theses written in the School of Education. The studies were based on 893 cases, freshmen in the university.

The findings of Mr. Garnett would indicate that the Thurstone examination (meaning the American Council on Education examination) has a greater predictive value for the first semester than the teachers' marks for four years of high school work.

In his thesis, "An Attempt to Shorten the Thurstone Psychological Examination," Mr. Gum has found that three tests of the examination gave a higher correlation with university success for the first semester than the entire examination. The tests of high correlation are the linguistic tests—grammar, reading, and opposites.

New York University, New York City, N. Y.

A report on a study made by a graduate student on the predictive value of the American Council tests in the College of Arts and in the College of Engineering was submitted by Professor Douglas Fryer.

A group of 103 men was selected from a larger group of applicants by the Committee on Admissions, this acceptance being based on work in the American Council on Education examination, on the preparatory school record of the applicant, and on a personal interview with the committee. Withdrawals, failure to register, and similar occurrences cut the group to 81 men, the number considered in the study.

The following correlations were obtained:

Median Percentile in American Council on Education Tests and average grade in college for the first semester	+.315
Arithmetic Test Scores and Grades in College Mathematics	+.204
Number Completion Scores and Grades in College Mathematics	+.077
Absurdities Scores and Grades in College Mathematics	+.236
Analogies II Scores and Grades in College Mathematics	+.347
Arithmetic Scores and Grades in College Mathematics (for Engineering students only)	+.129
Analogies II Scores and Grades in College Mathematics (for Engineering students only)	+.157
Absurdities Scores and Grades in College English	+.397
Completion Scores and Grades in College English	+.321
Opposites Scores and Grades in College English	+.355
Analogies I Scores and Grades in College English	+.130
Analogies II Scores and Grades in College English	+.374
Artificial Language Scores and Grades in Foreign Languages	+.187

While these coefficients of correlation are not very high, six of them are above +.30. High correlations are not to be expected in a selected group in which the applicants with low test scores have already been eliminated.

Oregon State Agricultural College, Corvallis, Ore.

Prof. G. F. Burch made a study of the predictive value of the separate tests, and the following results are taken from his report. The grade in the freshman course in electricity was used as a criterion, and the correlations obtained were:

Electricity grade and score in Estimating Test	.362
Electricity grade and score in Reading Test	.224
Electricity grade and score in Arithmetic Test	.208
Electricity grade and score in Reasoning Test	−.058
Electricity grade and score in Total Score Test	.305

University of Rochester, Rochester, New York

Prof. Z. Klain reports a correlation of +.426 between median percentile standing in the nine tests of the 1924 edition and college grade standing for thirty seniors.

Transylvania College, Lexington, Ky.

In a comparative study of the scores of men and of women in the 1924 edition of the test, Prof. Floyd W. Reeves found that "the superiority of the men in estimating ability and in arithmetic reasoning ability is outstanding, while that of

the women in artificial language, grammar, and other linguistic tests is also very marked."

Professor Reeves also made a study of the diagnostic value of the tests, and the section of his report concerned with this evaluation is given below:

An analysis of the data relating to the number of quality points earned by students and students' ranks on the psychological examination shows that the chances for a student classified in the upper quarter by the psychological tests to remain in the upper quarter on the basis of grades received, are about 50–50. However, the chances of the student classified in the lower quarter by the psychological test to be placed in the upper quarter on the basis of college grades are only 8 to 92.

Among the 25 students ranking highest on the psychological examination, 13 were also among the 25 students ranking highest in the number of quality points earned during the first semester, 8 were among the middle 50 per cent in number of quality points earned, and four were among the lower 25 per cent in number of quality points earned. Among the 25 students ranking lowest on the psychological test, only two were among the upper quarter of the class on the basis of quality points earned, while 11 were among the middle 50 per cent, and 12 were among the lower 25 per cent. Among the 50 students comprising the middle 50 per cent of the class, when grouped upon the basis of the psychological test, 11 were in the upper quarter of the class with respect to number of quality points earned, 29 were in the middle 50 per cent of the class, and 10 were in the lower 25 per cent of the class.

The relationship between quality points earned during the first semester at Transylvania College, quality points earned during the high school course, and rank on the intelligence test, are best represented in terms of coefficients of correlation. Six correlations were made by means of the Spearman Rank Method. The coefficients obtained were as follows:

1. High School grades and Psychological Test for both men and women..... $r = .07$
2. High School Grades and First Semester College grades for both men and women..... $r = .31$
3. Psychological Test and First Semester College grades for both men and women..... $r = .39$
4. Combined Psychological Test and High School grades and First Semester College grades for both men and women..... $r = .38$
5. Psychological Test and First Semester College grades for women only..... $r = .52$
6. Psychological Test and First Semester College grades for men only..... $r = .42$

Vanderbilt University, Nashville, Tenn.

Dean Walter L. Fleming has loaned a copy of a Master's dissertation in the Department of Mathematics on "The 1924 Intelligence Tests of Vanderbilt University." The thesis was written by Dewey S. Dearman. One section from the thesis and the table it discusses are copied here.

In Table XV are given two correlation coefficients, r' and r''. The first is the coefficient between the results of the intelligence test and the total grade for college performance, and the second is the coefficient between the results of the intelligence test and the average grade for college performance. Each of these coefficients has been calculated and listed in the table for ten groups of twenty-five students each (except for the last which contains but fifteen) and for the total number of students submitting to the test. It is from these correlation coefficients that we must draw our conclusions.

Correlation Coefficients for Groups of Twenty-five and for Entire Group

Group	*Number of cases*	r'	r''
I	25	0.846	0.875
II	25	0.749	0.761
III	25	0.281	0.292
IV	25	0.349	0.363
V	25	0.356	0.369
VI	25	0.274	0.291
VII	25	0.436	0.385
VIII	25	0.595	0.588
IX	25	0.636	0.634
X	15	0.919	0.912
Total	240	0.613	0.622

(Only the part of the table relative to this discussion is quoted.)

These coefficients for the entire group are in the case of the total grade 0.613 and for the average grade 0.622. There is, therefore a well-marked relation exhibited by these data between the results of the intelligence test and the results of university performance. Stated graphically we have a situation like this: If we plot the grade for the intelligence test on the x-axis and the grade for the university performance on the y-axis, we may expect to find the two hundred twenty five points so plotted grouped rather closely around a diagonal line. A study of the coefficients for the groups of twenty five reveals other facts concerning the clustering of these points about the above line.

It is noticed that in case of the total grade and of the average grade that the correlation coefficient is approximately 0.8 for the highest twenty-five and decreases to approximately 0.3 for the sixth group where it begins to increase until it is approximately 0.9 for the last group. This tells us that excellence in the intelligence test is followed by excellence in the university work, that inferior performance in the intelligence test is followed by inferior performance in university work, and that medium or fair performance in the intelligence test is followed by any degree of excellence in university work. We may expect, therefore, that along the lower part of our diagonal line the points will be grouped closely around the line. As the grade for the intelligence test increases we notice a divergence of the points from the line, finding them scattering, some above and some below the line until we reach the top where the points begin to cluster around it again. This diagonal is the line through the points as they would be located if the correlation coefficient were one, in which case the correlation would be perfect and positive.

Since we have calculated the values for the whole group and have not made use of samples picked at random we have a probable error which is negligible and is influenced only by the data and possible errors in the calculation of the various values, which checks and carefulness of computation have reduced to a minimum.

We conclude, therefore, that there is a well-marked correlation between results of the intelligence test and results of university performance. This interdependence is more marked in the case of excellent and inferior than for average performance.

This rather unusual analysis with the curious shifts in correlation can probably be at least partly accounted for by the fact that the criterion range is considerably restricted in the middle portions of the distribution. When a group of students is divided into ten *equal* subgroups by either variable it is expected that the extreme subgroups will cover a wider range and that the coefficients of correlation will be higher in the extremes than in the middle range.

University of Virginia, University, Va.

Prof. George O. Ferguson made a careful study of the relation between scores in the 1924 edition of the Psychological Examination and academic success. His report to the faculty was published in the University of Virginia Record Extension Series. The main results of his study are summarized in the following tables and paragraphs:

	N	*r*
Psych. Exam. and Avg. College Grade, 1st term (trimester)	391	0.57
Psych. Exam. and Number of term-hours passed, session.	397	.50
Psych. Exam. and Grade in College Chemistry, 1st term.	141	.41
Psych. Exam. and Grade in College Mathematics, 1st term	183	.45
Psych. Exam. and Grade in College French, 1st term	86	.51
Psych. Exam. and Grade in College English, 1st term	322	.63

Score on the psychological examination was the median of the percentile ranks on the eight tests given.

For comparison with the coefficients given above, the following were obtained:

	N	*r*
Avg. High or Prep. School Grade and Avg. College Grade 1st term	369	0.34
Avg. High or Prep. School Grade and Col. French Grade 1st term	84	.19
Avg. High or Prep. School Grade and Col. Math. Grade, 1st term	175	.22
Avg. High or Prep. School Grade and Col. English Grade, 1st term	302	.30
Avg. High or Prep. School Grade and Col. Chem. Grade, 1st term	133	.35
Avg. Prep. Grade in English and Col. Grade in English, 1st term	321	.35
Avg. Prep. Grade in Math. and Col. Grade in Math., 1st term	238	.25
Avg. Prep. Grade in Science and Col. Grade in Science, 1st term	247	.25
Avg. Prep. Grade in English and Avg. College Grade, 1st term	366	.27

Successive terms' work in the same course:

	1st and 2nd terms		*2nd and 3rd terms*	
	N	*r*	*N*	*r*
Mathematics	161	.58	129	.63
French	125	.64	110	.69
English	293	.66	310	.62
Chemistry	175	.77	149	.57

The median number of term (trimester) hours passed during the session by the students (approximately twenty) in each five-point interval of percentile rank on the psychological examination, was as follows (in making this computation, the medians of the percentiles on the eight tests of the examination were themselves reduced to percentiles):

Percentile rank	*Term-hours passed*	*Percentile rank*	*Term-hours passed*
95	46.5	45	31.0
90	41.0	40	30.6
85	41.0	35	23.0
80	43.8	30	28.0
75	40.0	25	21.7
70	37.5	20	19.5
65	32.4	15	20.2
60	28.5	10	19.5
55	31.5	5	10.5
50	28.5	0	3.0

The record of the forty-three students with percentile ranks below 10 was as follows in the first term (trimester): Four withdrew before the end of the term; twenty failed on all courses; ten passed one course each; six passed two courses each; three passed three courses each; none passed on all courses.

Wesleyan University, Middletown, Conn.

The following paragraphs are quoted from a report by Prof. H. B. English published in the February, 1927, issue of the *Wesleyan University Alumnus*.

One must not expect too much of intelligence tests here. A moment's reflection shows how complex are the factors which determine whether a man shall succeed in college. But it is instructive to see what sort of intelligence rating is made by those who do in fact fail. Of the nineteen men dismissed for low scholarship, four were rated *E* by the tests, three *D*, five *C*, and one *B*. It is interesting to note also the ratings of those who withdrew from college either voluntarily or for disciplinary reasons. Three got *E*, one *D*, three *C*, and one *B*. This is virtually the same distribution as for those dismissed for low scholarship. Of the other students rated *E* on the tests, two got a *C*-average in college and one got *D*. Thus of those rated *E*, by the tests, only a fifth finished the year in good standing.

While this does not indicate that all flunkers are of low intelligence (which no one believes) nor that all of relatively low intelligence will become flunkers (which no one ought to expect), it does indicate that if we center our effort upon getting men of high intelligence, we shall lower the "mortality" very considerably.

Agreement of the test ratings with academic record may also be seen from the following table. It may be assumed that a student whose average scholarship is *B*− is decidedly satisfactory from that angle, that one whose average is *C*− is reasonably satisfactory, while one whose academic average is *D*+ or worse is unsatisfactory. (Note that one speaks here only of academic standing; no effort is being made to take account of other important qualities.)

It is again apparent from the table that we are not ready to make a student's intelligence test score the measure of his fitness for college. Yet when we notice that 25 per cent of those who do poor work are persons with low test ratings while only 4 per cent of those who do good work have such a rating, one wonders whether the tests could not be made, not indeed the *sole* criterion, but an important criterion to be used *in connection with and in addition to* existing methods of selection.

Psychological Ratings Compared with Grades in the Freshman Year 1925–1926	Ancient Languages	Biology	Chemistry	English	Ethics	History	Mathematics	Modern Languages	Physics	All Subjects
1. % of low testers getting D+ or less	50	40	19	60	25	46	55	36	67	50
2. % of low testers getting C− or better	50	60	81	40	75	54	45	64	33	50
3. % of low testers getting B− or better	12	10	9	6	0	4	4	18	0	3
4. % of high testers getting D+ or less	12	22	15	30	20	25	33	20	14	21
5. % of high testers getting C− or better	88	78	85	70	80	75	67	80	86	79
6. % of high testers getting B− or better	50	44	33	39	20	25	33	29	56	33
7. % of low graders having low test score	50	25	18	32	25	25	33	22	25	25
8. % of low graders having high test score	19	12	15	20	25	16	20	14	12	14
9. % of high graders having low test score	7	14	8	6	0	6	4	14	0	4
10. % of high graders having high test score	50	57	33	53	100	50	40	33	40	54
11. % of poor students who would be eliminated if all low testers were eliminated	50	25	18	32	25	25	33	22	25	25
12. % of good students who would be eliminated if all low testers were eliminated	7	14	8	6	0	6	4	14	0	0
13. Average test score of those electing various courses. Scale based on % C ranks	59	49	50	53	53	52	52	52	60	0
14. Number of students in each subject	75	39	64	172	31	132	134	165	26	171

Explanation:

(A) A low grader is one whose average in scholarship is *D+* or worse.
(B) A high grader is one whose average in scholarship is *B−* or better.
(C) A low tester is one whose intelligence rating puts him in the lowest fifth of the class.
(D) A high tester is one whose intelligence rating puts him in the top quarter of the class.

Wilson College, Chambersburg, Pa.

Pearson coefficients of correlation were computed for several tests of the 1924 edition and scholarship.

Correlation between English grades and the Grammar test	+ .82
French grades and Artificial Language	+.432
Latin grades and Artificial Language	+.187
English grades and Opposites	+.654
Correlation between English grades and the average of all the tests	+.560
Latin grades and the average of all the tests	+.445
French grades and the average of all the tests	+.710
Correlation between the average grades for college work and the average of all the tests	+.595

Winona State Teachers College, Winona, Minn.

Prof. W. A. Owens made a study of equivalent scores in the American Council on Education examination and the Army Alpha Test. This procedure was possible because both tests had been given to the same individuals. As a result of the equating process, "equivalent" scores were obtained which in this case were American Council Test scores in terms of Alpha scores. The "equivalent" scores and those actually obtained in the Alpha Test were not always the same for the same individual and these differences or discrepancies were further studied. Since the American Council Test was longer and admittedly more difficult than the Army Alpha, differences in favor of the "equivalent" score were interpreted as meaning greater staying qualities, and the group having such differences was called "motivated." Where the actual Alpha scores were higher than the "equivalent," the group was called "under-motivated."

An examination of the scholastic grades of all students having discrepancies of either sort showed that 62.8 per cent of them performed as the discrepancy indicated. Thus the "motivated" group had higher scholastic grades than would have been predicted on the basis of the actual Alpha scores using norms previously established at Winona. Likewise the "under-motivated" group had lower scholastic grades than would have been predicted.

The American Council tests thus seem to give improved predictability, probably due to the demand for purpose and sustained effort.

It is of some interest to examine the equivalent scores, which are given in the following table:

Percentile	Army Alpha	A. C. E.	Percentile	Army Alpha	A. C. E.
100	200	99.83	49	140.40	52.23
99	185.55	94.25	48	139.87	51.72
98	178.83	91.00	47	139.04	51.21
97	175.49	88.20	46	138.20	50.70
96	174.02	85.60	45	137.37	50.19
95	172.84	84.13	44	136.54	49.60
94	171.66	82.95	43	135.70	48.95
93	170.48	81.82	42	134.89	48.30
92	169.42	80.69	41	134.18	47.65
91	167.44	79.62	40	133.47	47.00
90	167.46	78.66	39	132.76	46.35
89	166.48	77.70	38	132.04	45.70
88	165.51	76.74	37	131.34	45.05
87	164.58	75.77	36	130.62	44.50
86	163.73	74.88	35	129.92	43.95
85	162.87	74.16	34	129.13	43.41
84	162.01	73.44	33	128.35	42.87
83	161.15	72.72	32	127.58	42.12
82	160.29	72.00	31	126.77	41.79
81	159.54	71.27	30	125.98	41.25
80	158.85	70.55	29	125.19	40.70
79	158.16	69.85	28	124.37	40.16
78	157.47	69.21	27	123.54	39.57
77	156.77	68.58	26	122.70	38.95
76	156.08	67.95	25	122.87	38.33
75	155.39	67.31	24	121.04	37.71
74	154.71	66.68	23	120.20	37.09
73	154.05	66.04	22	119.21	36.47
72	153.40	65.41	21	118.16	35.85
71	152.74	64.78	20	117.11	35.23
70	152.08	64.14	19	116.06	34.60
69	151.42	63.51	18	115.01	33.95
68	150.76	62.87	17	114.06	33.30
67	150.10	62.24	16	113.12	32.65
66	149.48	61.36	15	112.17	32.00
65	148.86	60.97	14	111.23	31.35
64	148.24	60.34	13	110.28	30.70
63	147.63	59.47	12	109.05	30.05
62	147.01	59.19	11	107.70	28.80
61	146.39	58.63	10	106.35	27.50
60	145.78	58.08	9	105.00	26.20
59	145.16	57.53	8	102.65	24.91
58	144.65	56.97	7	100.28	23.78
57	144.18	56.33	6	98.22	22.65
56	143.71	55.87	5	96.16	21.52
55	143.23	55.31	4	94.10	20.39
54	142.76	54.78	3	91.92	18.78
53	142.29	54.27	2	88.90	16.92
52	141.82	53.76	1	81.67	15.08
51	141.34	53.54			
50	140.87	52.74			

The College of Wooster, Wooster, Ohio

The following paragraphs are quoted from a letter of Prof. Martin Remp:

We made a study of the relation between the scholarship marks of the first semester and the test ratings.

The percentile rank of the student on the nine tests combined was used as the rating in the psychological examination.

A scholarship index was used for the scholarship rating. Each hour or work in *A* was given 4 points; *B*, 3 points; *C*, 2 points; *D*, 1 point; *E* and *F*, no points. The total number of points divided by the number of hours carried gives the index.

The Pearson coefficient of correlation is .52.

A study of decile deviation was also made to determine to what extent students differ in relative position in the two ratings. The 270 students were divided into ten equal groups according to test rating; also into ten groups according to scholarship rating. Group 1, the poorest tenth; group 2, the next tenth; group 10, the best tenth.

48 scores have no deviation. (Are in the same tenth in both.)
75 scores have deviation of 1.
57 scores have deviation of 2.

This accounts for two-thirds of the scores. The remaining third scatter as follows:

29 scores have deviation of 3.
28 scores have deviation of 4.
11 scores have deviation of 5.
12 scores have deviation of 6.
8 scores have deviation of 7.
2 scores have deviation of 8.

L. L. THURSTONE.